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REPORTS

FROM

COMMITTEES:

EIGHT VOLUMES.

—*(5.)*—

MALT TAX; METROPOLIS SUBWAYS BILL;
TRAFFIC REGULATION (METROPOLIS) BILL [H. L.]

Session
5 *February* —— 21 *August* 1867.

VOL. XI.

1867.

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REPORTS FROM COMMITTEES:

1867.

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FIFTH VOLUME.

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REPORT

FROM THE

SELECT COMMITTEE

ON

MALT TAX;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND APPENDIX.

Ordered, by The House of Commons, *to be Printed,*
25 *July* 1867.

470.

Tuesday, 14*th May* 1867.

Ordered, THAT a Select Committee be appointed to inquire into the operation of the Malt Tax.

Friday, 31*st May* 1867.

Ordered, THAT the Select Committee on the Malt Tax do consist of Nineteen Members.

Committee nominated of—

Mr. Stephen Cave.
Mr. Hunt.
Mr. Goschen.
Mr. G. Shaw Lefevre.
Mr. Laing.
Mr. Arthur Peel.
Mr. Ayrton.
Lord Eustace Cecil.
Sir Edward Manningham Buller.
Mr. Read.
Major Parker.
Mr. Henry Surtees.
Mr. More.
Mr. Dent.
The O'Conor Don.
Mr. Hardcastle.
Mr. Benyon.
Colonel Barttelot.

Ordered, THAT the Committee have Power to send for Persons, Papers, and Records.

Ordered, THAT Five be the Quorum of the Committee.

Monday, 3*rd June* 1867.

Ordered, THAT Colonel Duncombe be added to the Select Committee.

Thursday, 25*th July* 1867.

Ordered, THAT the Committee have power to Report their Observations, together with the Minutes of Evidence taken before them, to The House.

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REPORT.

THE SELECT COMMITTEE appointed to inquire into the operation of the MALT TAX;——HAVE considered the matters to them referred, and have agreed to the following REPORT:—

YOUR COMMITTEE have examined several witnesses on the subject referred to them, but in consequence of the late period of the Session, and the large interests involved in the question, have been unable to complete their inquiry; they have, therefore, agreed to report the evidence already taken, and to recommend to The House that the Committee be re-appointed in the next Session of Parliament.

25 *July* 1867.

PROCEEDINGS OF THE COMMITTEE.

Thursday, 20th June 1867.

MEMBERS PRESENT:

Mr. Henry Surtees.
Mr. Read.
Major Parker.
Mr. Arthur Peel.
Colonel Duncombe.
Mr. Hardcastle.
Mr. Ayrton.
Colonel Barttelot.
Mr. Shaw Lefevre.
Mr. Laing.
Lord Eustace Cecil.
Mr. Benyon.

Colonel Barttelot was called to the Chair.

The Committee deliberated.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 24th June 1867.

MEMBERS PRESENT:

Colonel Barttelot in the Chair.

Mr. Read.
Major Parker.
Colonel Duncombe.
Sir Edward Buller.
Mr. More.
Mr. Henry Surtees.
Mr. Arthur Peel.
Mr. Laing.
Lord Eustace Cecil.
Mr. Shaw Lefevre.
The O'Conor Don.
Mr. Goschen.

Mr. *W. H. Stephenson* and Mr. *William Carling* were severally examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 27th June 1867.

MEMBERS PRESENT:

Colonel Barttelot in the Chair.

Sir Edward Buller.
Colonel Duncombe.
Major Parker.
Mr. Henry Surtees.
Mr. Read.
Mr. Dent.
Mr. Hardcastle.
Mr. More.
Mr. Arthur Peel.
The O'Conor Don.
Mr. Hunt.
Mr. Ayrton.
Mr. Goschen.
Lord Eustace Cecil.
Mr. Shaw Lefevre.
Mr. Stephen Cave.

Mr. *W. Carling* further examined.

Mr. *Charles Randall* examined.

[Adjourned till Monday next, at One o'clock.

Monday, 1*st July* 1867.

MEMBERS PRESENT:

Colonel BARTTELOT in the Chair.

Sir Edward Buller.
Major Parker.
Mr. Read.
Mr. Henry Surtees.
Mr. Dent.
Lord Eustace Cecil.
Mr. More.
Mr. Hardcastle.
Mr. Ayrton.
Mr. Stephen Cave.
Mr. Arthur Peel.

Mr. *R. L. Everett* and Mr. *John Clayden* were severally examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 4*th July* 1867.

MEMBERS PRESENT:

Colonel BARTTELOT in the Chair.

Sir Edward Buller.
Mr. Hunt.
Mr. Dent.
Mr. Henry Surtees.
Mr. Hardcastle.
Mr. Read.
Major Parker.
Lord Eustace Cecil.
Mr. Ayrton.
Colonel Duncombe.
Mr. Shaw Lefevre.
Mr. Goschen.
Mr. Laing.
The O'Conor Don.
Mr. More.

Mr. *John Clayden* further examined.

Room cleared.—The Committee deliberated.

Mr. *Thomas Ellman* examined.

[Adjourned till Monday next, at One o'clock.

Monday, 8*th July* 1867.

MEMBERS PRESENT:

Colonel BARTTELOT in the Chair.

Mr. Read.
Mr. Dent.
Colonel Duncombe.
Major Parker.
Mr. Henry Surtees.
The O'Conor Don.
Mr. More.
Sir Edward Buller.
Lord Eustace Cecil.
Mr. Stephen Cave.
Mr. Goschen.

Mr. *E. S. Cayley* examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 11*th July* 1867.

MEMBERS PRESENT:

Colonel BARTTELOT in the Chair.

Lord Eustace Cecil.
Mr. Arthur Peel.
Mr. Dent.
Mr. Read.
Major Parker.
Mr. Henry Surtees.
The O'Conor Don.
Sir Edward Buller.
Mr. More.

Mr. *E. S. Cayley* further examined.

[Adjourned till Monday, 22nd July, at One o'clock.

Monday, 22*nd July* 1867.

MEMBERS PRESENT:

Colonel BARTTELOT in the Chair.

Mr. Dent.
Colonel Duncombe.
Major Parker.
Mr. Henry Surtees.
Mr. Arthur Peel.
Mr. Read.
Sir Edward Buller.
Lord Eustace Cecil.
Mr. More.
Mr. Ayrton.
Mr. Cave.

Mr. *C. H. Lattimore* and Mr. *Henry Smith* were severally examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 25*th July* 1867.

MEMBERS PRESENT:

Colonel BARTTELOT in the Chair.

Mr. Henry Surtees.
Mr. Dent.
Colonel Duncombe.
Major Parker.
Mr. Read.
Mr. Arthur Peel.
Lord Eustace Cecil.
Sir Edward Buller.
Mr. Shaw Lefevre.
Mr. Goschen.
Mr. Cave.

Mr. *Albert Pell* and Mr. *William Biddell* were severally examined.

Draft Report proposed by the Chairman read the first and second time, and agreed to.

Ordered, To Report, together with the Minutes of Evidence and Appendix.

EXPENSES OF WITNESSES.

NAME OF WITNESS.	Profession or Condition.	From whence Summoned.	Number of Days Absent from Home, under Orders of Committee.	Expenses of Journey to London and Back.	Allowance during Absence from Home.	TOTAL Expenses Allowed to Witness.
				£. s. d.	£. s. d.	£. s. d.
Charles Randall -	Agriculturist -	Evesham - - -	1	2 – –	1 1 –	3 1 –
Robert Lacy Everett -	Agriculturist -	Ipswich - - -	2	2 5 –	2 2 –	4 7 –
John Clayden - -	Agriculturist -	Audley End - -	3	2 – –	3 3 –	5 3 –
Charles Higby Lattimore.	Agriculturist -	St. Albans - -	1	– 15 –	1 1 –	1 16 –
Albert Pell - -	Agriculturist -	Northampton - -	2	1 8 6	2 2 –	3 10 6
William Biddell - -	Agriculturist -	Horstead, Bury St. Edmunds.	1	1 11 6	1 1 –	2 12 6
Henry Smith - -	Agriculturist -	Shiffnall - - -	1	1 19 –	1 1 –	3 – –
					TOTAL - - - £.	23 10 –

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MINUTES OF EVIDENCE.

Monday, 24*th June* 1867.

MEMBERS PRESENT:

Colonel Barttelot.
Sir Edward Manningham Buller.
Lord Eustace Cecil.
Mr. Dent.
Colonel Duncombe.
Mr. Goschen.
Mr. Laing.
Mr. Shaw Lefevre.
Mr. More.
The O'Conor Don.
Major Parker.
Mr. Arthur Peel.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

WILLIAM HENRY STEPHENSON, Esq., called in; and Examined.

W. H. Stephenson, Esq.

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1. *Chairman.*] YOU are Chairman of the Board of Inland Revenue, are you not?—I am.

2. How long have you been in that position? —I was appointed in December 1862.

3. Were you in the Inland Revenue Department prior to that?—No; before that time, I was in the Treasury.

4. Has your attention been specially called, since you have been in the Inland Revenue, to the subject of the malt tax?—Yes, it has upon several occasions.

5. Generally, have you mastered all its details? —I can hardly say that I have mastered all its details, but I have endeavoured to make myself master of its general principles rather than of minute details.

6. When was the malt duty first imposed?— The first imposition of the malt tax was in 1697, that was for England only; in Scotland it was imposed in 1713, and it was extended to Ireland in 1785.

7. What have been the rates of duty?—There have been various rates of duty at different times; the most important changes I can give you pretty shortly.

8. Will you state what the duty was when it was first imposed?—In 1697, on its first imposition, it was 6*d.* a bushel; in 1713, when it was extended to Scotland, it was 6*d.*; and, in 1726, in Scotland it was reduced to 3*d.* Then, in England, in 1760, it was raised to 9¼*d.* a bushel; in 1780 it was raised to 1*s.* 4¼*d.* a bushel, and to 8*d.* a bushel in Scotland. Then, in 1785, the duty was imposed in Ireland, at 7*d.* a bushel: that was raised, in 1795, to 1*s.* 3*d.* Then, in 1802, it was respectively, 2*s.* 5*d.* in England, 1*s.* 8¾*d.* in Scotland, and 1*s.* 9½*d.* in Ireland. In 1804, which was a year of war tax, it was raised to 4*s.* 5¾*d.* in England, 3*s.* 9½*d.* in Scotland, and 2*s.* 3½*d.* in Ireland. In 1813 it was raised to 3*s.* 3¾*d.* in Ireland, and in 1815 it was raised to 4*s.* 5*d.* in Ireland. Then, in 1816, the duty was reduced to what it had been prior to 1804, namely, 2*s.* 5*d.* in England, and 1*s.* 8¾*d.* in Scotland, but it was reduced to 2*s.* 4½*d.* in Ireland. In 1819 it was raised to 3*s.* 7¼*d.* in England and Scotland, and 3*s.* 6¾*d.* in Ireland.

9. Then it would appear that, in 1819, the first time the duty was the same in England as in Scotland?—Yes.

10. And in 1819 it was still different in Ireland?—There was a very slight difference. Then, in 1822, the duty was fixed at 2*s.* 7*d.* uniformly.

11. Is there anything on record which would show why there was a different duty up to that time in Scotland and in Ireland?—I can give no particular answer, except that I know that in the early history of the duty it was found that they could collect no duty at all in Scotland at 6*d.*, and that was the reason of its reduction to 3*d.* in 1726, and I presume that has been the reason subsequent to that time, for maintaining the difference.

12. Mr. *Laing.*] The spirit duties were widely different during that time between England and Scotland, were they not; at the period when the malt duties were assimilated there was such a wide difference, that probably that might be the reason?—Probably that was the reason. Then, in 1822, it was imposed at 2*s.* 7*d.*, at which it stands at the present time, with the exception of 5 per cent., which was added in 1840 to the Excise duties generally, making the actual impost 2*s.* 8½*d.* For a short time, from 1854 to 1856, there was a duty of 4*s.* during the Crimean war, and after that it reverted to 2*s.* 8½*d.*, as it stands now.

13. *Chairman.*] Under what law is the duty now levied?—The duty is charged under the Act of

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of 6 Geo. 4, c. 58. There are several other Acts which regulate the duty; and I have prepared a table which gives the whole of the Acts at present in force, which, perhaps, it might be convenient for the Committee to have; and, if so, I can hand it in. They are tabulated according to the different subjects to which they relate. (*The Witness delivered in the same*, vide *Appendix.*)

14. What quantities of malt were charged with duty during the earlier period of the tax, and subsequently?—The first account that we can obtain is for 1702, and the quantity then was 12,166,178 bushels. In the following year it rose to 26,754,505 bushels. I have had made out a tabulated statement showing the quantity during decennial periods, from 1710 to 1830, and it is very remarkable, I think, that, taking decennial periods, there is little or no variation in the amount levied; it is 25,000,000 bushels, as near as can be, with very slight variation. From 1811 to 1820 it went down to 23,000,000; but with that exception it is very curious how close the average goes; it was 25,000,000 till 1830. In 1830 the beer tax was repealed, and from that time there has been a very rapid increase, till now, in 1866, the amount is over 45,000,000, that is for England only.

15. Have you any return for Scotland and Ireland?—Yes, I have. There is no account for Scotland until 1770; but from that period, down to 1800, the average annual produce may be taken at about 1,500,000. From 1801 to 1810 it is 1,100,000; and again, to 1820 it is the same. Then, from 1821 to 1830 it is 2,800,000; from 1831 to 1840, 4,400,000; from 1841 to 1850, 4,100,000, and from 1851 to 1860, 2,400,000. In Ireland, the first year, 446,343 bushels were charged: and from that period down to 1800 the yearly average was as nearly as possible 4,300 000. Then, from that time it has been gradually decreasing. From 1801 to 1810 it was 2,700,000; from 1811 to 1820, 2,200,000; from 1821 to 1830, 2,100,000; the same from 1831 to 1840; from 1841 to 1850, 1,500,000; and from 1851 to 1860, 1,700,000.

16. Can you furnish a statement of the quantities of malt charged with duty made duty free, and exported during the last 10 years?—There is a table appended to the last Report of the Inland Revenue Commissioners, of which I have an abstract, and which I think it might be convenient for the Committee to have. I have taken it out from the printed tables, where all those particulars are given, which I will hand in. (*The Witness delivered in the same*, vide *Appendix.*)

17. What is the amount of the revenue derived from the malt tax?—The net revenue for the year ending the 31st of March 1867, was 6,816,385 *l.* I have had an account prepared of the net receipt from the malt duty for the last 10 years, beginning from 1857, which I thought the Committee might perhaps like to see. (*The Witness delivered in the same*, vide *Appendix.*)

18 Mr. *Laing.*] Was it the same duty in 1857 that it had been since 1822?—Yes; the war duty ceased in 1856 and in 1857, it was 5,690,949 *l.*; in 1858, 5,326,022 *l.*; in 1859, 5,412,777 *l.*; in 1860, 6,648,881 *l.* I may as well observe here that the great rise in that year was in consequence of the alteration in the credits; the credits were shortened in that year, and therefore, of course, a larger amount of revenue came into the year than was properly due to it. In 1861, it was 6,208,813 *l.*; in 1862, it was 5,866,302 *l.*; in 1863, 5,389,909 *l.*; in 1864, 6,092,736 *l.*; in 1865, 6,394,553 *l.*; in 1866, 6,421,260 *l.*; and the amount for 1867 I have already given.

19. *Chairman.*] How is the malt duty charged?—The grain is gauged whilst in steep, and an allowance is made for the swell of the grain; that is to say, supposing 100 bushels of barley are charged by gauge, 18½ per cent. is taken off for the swell; 100 bushels, therefore, would be gauged at 81½ for duty.

20. Sir *Edward M. Buller.*] One hundred bushels of barley when steeped, would produce a good deal more than 100 bushels, would it not?—Yes; but the duty is charged as if there had been only 81½ bushels of barley, allowing 18½ per cent. for the swell of the grain.

21. If you steep 100 bushels of barley, and add 18½, then of course, when it is swollen, it will be 118½ bushels?—It is gauged in the cistern after it has been steeped, and then 18½ is deducted from it; the deduction is made after the barley has been in steep.

22. Then it would be 100 bushels of steeped barley?—It would be 100 bushels of steeped barley, which would be taken for duty at 81½.

23. *Chairman.*] In what part of the operation is this duty charged?—It is charged when it is in the cistern in the first instance, when it is in steep, that is the first charge; after that it is gauged again in the couch, and from time to time on the floor; but practically the charge is made upon the grain after the water has been first drained off, and the grain is removed to couch.

24. What is the amount of allowance on the gauge?—18½ per cent.

25. Is that considered satisfactory?—I believe quite so. It was settled after an arrangement with the trade; it had formerly been larger, but was considered excessive, and reduced to 17½, and then subsequently it was settled at 18½, at which it now is by general arrangement with the trade, and I believe it is considered satisfactory to them. I have not heard any complaint made upon the subject since that settlement.

26. Is the revenue collected without much fraud or evasion?—I should say that there is hardly any now. I think that the frauds, which are committed to a very trifling extent, form a very small proportion with reference to the number of traders.

27. Were there not some very large frauds committed a few years ago?—A great many years ago. I do not think there has been any extensive fraud during the time that I have been connected with the department.

28. Do you recollect in what year the last large fraud was?—I forget what the last great fraud was.

29. It was a fraud that took place in Sussex, was it not?—Yes; I should think it must have been about 1860, but I am not quite sure.

30. How is the duty collected?—It is collected half-quarterly; it is collected what is called roundly, that is to say, the collectors go round twice in the quarter; they collect the duty charged from the first day of the quarter to the 15th day of the middle month, and then from the 16th to the end of the quarter, making eight collections in the course of the year; the interval being on the average six weeks or a little more.

31. Do you consider that that presses heavily upon the maltsters?—If you mean that it presses on them heavily from their having to

pay

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pay the duty too quickly, I may state that any maltster who desires to have time to pay his duty, can have it allowed him on giving a bond. A maltster who does not work under bond, has to pay his duty nominally within six days from the time the account is made up, but practically he does not pay his account within a fortnight, because the collector does not commence his round immediately upon the close of the quarter; he waits generally some 10 or 12 days. Therefore, practically, a maltster who does not give a bond gets about an average of 12 days' credit, or if he gives a bond, he has six weeks' credit; and for the three last rounds he has the further credit of three months, if he gives a bond and pays interest at the rate of 3¼ per cent.

32. Sir *Edward M. Buller.*] He does not pay interest, does he, upon the first bond?—No.

33. *Chairman.*] What is the present number of malt-houses in the United Kingdom?—At the present time there are 9,703.

34. What was the number in the year 1835, when the inquiry into the Excise Establishment was held?—In 1835 the number was 14,025 in the United Kingdom.

35. What has been the cause of the diminution in the number?—To some extent, I have no doubt, it may be attributable to the natural tendency of capital to concentrate in concerns of this kind, and to some extent to this also, that brewers have of late erected a good many malt-houses. Brewers now make malt largely for themselves; but I think also it is in great measure attributable to the effect of railways; many persons have erected malt-houses in the neighbourhood of railway stations, which afford very convenient access at all times, both for receiving supplies and for sending them out again; those three causes combined, but I think chiefly the latter, have caused the diminution.

36. Has shortening the malt credit been a cause, do you think?—No, I think not, because it has been a gradual decrease, and it commenced before the credits were shortened.

37. Mr. *More.*] Has not the same phenomenon been observed in other countries?—I am not aware of that; but no doubt the same causes would operate elsewhere in the same direction.

38. *Chairman.*] Is there not a drawback of the malt duty on beer exported?—Yes, there is.

39. On what quantity of beer was the drawback given last year?—Last year the drawback was on 610,670 barrels, which would be equivalent to 1,412,000 bushels of malt.

40. How is the drawback computed?—There is a regular scale fixed according to the strength or the specific gravity of the beer. Samples are taken of the beer. I have here a statement, which I thought the Committee would like to have, which shows the different rates of drawback on the beer which varies, as I have said, according to its specific gravity. (*The Witness delivered in the same*, vide *Appendix.*)

41. Do you know what is the consumption of malt per head of the population?—In the United Kingdom in last year, the average was 1·63 bushels per head; but the Committee are aware that that varies considerably in the three kingdoms.

42. Can you state to the Committee what it is for England, Scotland, and Ireland?—For England, 2·08; Scotland, ·74; Ireland, ·43.

43. Was there a beer duty concurrently with the malt duty in force at any time?—Yes, there was.

44. From what period to what period?—The beer duty was repealed in 1830.

45. When was that beer duty first imposed?—I think the beer duty was imposed in the reign of Charles the Second.

46. Could you give the Committee the rates per barrel of that beer duty, going back to the origin?—I will see if it can be done; I am not quite sure whether we have records so far back as that.

47. Mr. *Laing.*] Was not the effect of the beer duty to increase the tax to the consumer?—No doubt.

48. If there was a double duty first on the malt, and then on the beer, that was equivalent to an increased tax to the consumer?—Yes.

49. Have you looked back to the consumption per head during the early period of the 18th century while the production of malt remained stationary?—I have looked at that; and I could furnish a table showing that to the Committee.

50. Could you also furnish to the Committee a table showing the consumption per head from the period you begin your statement of the malt duty, taking it with the duty of that period and showing concurrently what has been the incidence of the beer tax in addition to the duty on malt?—Yes.

51. Mr. *Goschen.*] Can you say how many bushels of malt were consumed last year?—The printed paper which I put in, which is a part of the Appendix to our Annual Report, gives the bushels charged with duty and the bushels exported, the quantity made duty free for cattle feeding, the quantity made duty free for exportation and distillation and discharged from duty, and therefore that paper would give that information.

52. *Chairman.*] What is the law allowing malt to be made duty free for the feeding of animals?—It is the 27th Vict. c. 9, passed in 1864.

53. How many malt houses have been worked under that Act?—Twenty-seven altogether.

54. What have been the quantities made?—In 1865 the quantities were 62,257 bushels; in 1866, 26,847 bushels; in 1867, 5,075 bushels.

55. To what is this falling off attributable?—Out of the 27 houses that did work there are now only four remaining; and as to the 23 which have ceased to work the general reason given has been the want of demand; in one or two instances, or rather one instance, I think, only they have pleaded the inconvenience of the excise regulations and in one instance I think a complaint was made of the difficulty of procuring linseed of the required quality; but with those two exceptions they have all stated a falling off in the demand as the reason.

56. What has been the effect of the law allowing duty to be charged according to the weight of the barley?—That Act was passed in 1865, and it is the 28th & 29th Vict. c. 66. It was estimated then that about 7 per cent. of the malt would be worked under the law, the result has been that about 4 per cent. is shown by the quantities used in 1865; the loss of revenue was estimated at 10,000*l.* the first year; last year I see there were 575 malt-houses worked under this law; the duty surrendered was 27,000*l.*, and the quantity used, 3,670,000 bushels; and I think that that would make about 7 per cent. upon the quantity. The duty was given up, and they pay less duty from the difference in weight.

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57. Mr. *Goschen.*] Do you mean that the loss of revenue was 27,000 *l.*?—Yes.

58. *Chairman.*] What was the average weight of barley used?—It was 50$\frac{2}{5}$ths lbs. per bushel.

59. Was that barley British grown or imported?—We have no means of ascertaining that; we cannot distinguish between the two.

60. What is the cost of collecting the duty?—That cannot be given very accurately, because the officers employed in collecting the malt duty have other duties to perform also; but I should say about 3 per cent. might be taken as a pretty fair estimate, or we might take it in another form, and say that it is about 1 *d.* per bushel.

61. Do you think that that may be taken as the full amount of the cost of collecting the duty?—So far as we can ascertain by separating it from other duties as well as we can, I should think that about 3 per cent. was a fair estimate.

62. Mr. *Goschen.*] Do you consider that it is an expensive tax to collect as compared with other taxes, or the reverse?—No, I should say it is an economical tax in that respect; 3 per cent. is a low per-centage for the collection of taxes.

63. But as compared with other taxes, is it an economical tax to collect?—Yes, certainly.

64. As regards protection against fraud, is the proportion of the loss by fraud to the aggregate amount of the tax greater or less in your judgment, than in the case of other taxes, or in other words, is it a tax easily evaded?—No, I do not think it is, judging from the result that prosecutions for evasion are very few in number.

65. Does that arise from the nature of the trade?—No doubt, to some extent it does. Of course evasions of duty are much less likely to occur when the trade is in few hands, and worked upon a very large scale, because you have a better class of persons, generally speaking, with whom to deal.

66. With regard to the drawback which was allowed last year, as you have stated to the Committee, upon 1,400,000 bushels, what proportion of the total consumption is represented by those 1,400,000 bushels?—It would be for the United Kingdom rather over 50,000,000, and a million and a-half upon 50,000,000 would be about 3 per cent.

67. Is the 1,400,000 included in the paper which you are going to hand in of the total consumption?—Yes, it is.

68. What was the system of collection of the beer duty which was given up in 1830?—I do not know that I could state at this moment the exact mode in which it was collected, but Mr. Carling, who I believe will be examined after me, will be able to do that, because he was conversant with it and assisted in the collection of the duty at that time; but generally, I may say that it was collected much in the same way that the malt duty is by officers watching the manufacture and taking an account of the quantities produced and of the strength.

69. Does the system of bonds work well?—I have no reason to believe that it works otherwise than well.

70. Has the revenue lost money by the system of credits owing to any maltsters having failed?—Not certainly to any appreciable extent.

71. Colonel *Duncombe.*] Can you state to the Committee the amount of the beer duty the year before it was repealed?—In 1829 in England it was 3,217,812*l.*, and in Scotland 76,885 *l.*

72. Mr. *Surtees.*] How long does it take from the commencement of the operation of malting barley to the completion of the operation?—About a fortnight, 12 to 14 days.

73. How soon after that completion is the duty collected?—That would depend in some measure upon the time the operation took place, because the duty being collected periodically, if the malt was made in the first fortnight of the round, of course it would be a considerable time before the duty was paid. If it was made at the latter end of the round it would be a very much shorter time, because the accounts are made out every six weeks.

74. Can you give the Committee a statement of what the consumption of malt was in 1851, 1852, and 1853, with the duty; and what it was in 1854 and 1855, with the duty; and what it was in 1856, 1857, and 1858?—I will have that statement prepared.

75. Mr. *Read.*] I think you stated, did you not, that the malt tax was first imposed in 1697, and that there is no return until 1702; can you give any reason for that?—No, I cannot; there are no records that I am aware of.

76. Could you explain how it came to pass that the next year, 1703, the quantity of malt was doubled?—You will find that I have taken decennial periods, and in those periods the amount is wonderfully even; but if you take year by year you will find great variations; probably that would have reference to the price of barley; if there was any variation in the price of barley there would be, naturally enough, a variation in the amount of malt produced.

77. I presume in the first return you would not expect much accuracy?—Probably not; and very likely that may have been one reason why there was such a large difference in the two years.

78. Was the beer tax universally levied in Ireland and Scotland as well as in England?—It was levied in Scotland, but not in Ireland.

79. Was it the same amount as that paid in England?—I think it was the same amount as that paid in England; I do not think that there was any difference in the rates of beer duty.

80. Could you state why there has been such a marked decrease in the quantity of malt made in Ireland?—The fact is that almost the whole of the malt is made in England; there is very little made either in Ireland or in Scotland. I suppose that people of capital in England find it more easy to make it in large quantities, and that they can make it more economically; I do not know of any other reason than that.

81. It would appear that Scotland has increased in the consumption of malt, although Ireland has diminished?—Yes; Scotland makes a good deal of whiskey from malt, and Ireland makes very little.

82. The return which you have given in would not include, the malt that pays duty in the making of whiskey?—No, it would not; we should only go by the duty. Malt used in making spirits is duty free. But a great deal of ale is brewed in Scotland.

83. You have stated that there are, comparatively speaking, no frauds now-a-days in the malt duty; was there not something of a fraud last week in Ireland that we read of?—Yes, there was, but that was only one case amongst a comparatively small number.

84. When you gave the Committee the net amount

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amount of revenue from malt for the last year at 6,816,385 *l.*, you meant the net, allowing for the drawbacks, did you not?—Yes, that is the net revenue.

85. Not with the cost of collection taken off?—No.

86. You have eight collections in the year; when does your financial year begin?—On the 1st of April.

87. How much malt is made from June to September?—I do not know that I could give you that now; I could very easily get it for you.

88. Is there not comparatively none?—A very small quantity from May, we may say, till October.

89. What do you employ the Excise officers about during that time?—They have a great many other duties to perform.

90. Have they other duties to perform particularly in that leisure period?—Yes, there are some duties upon which they are employed to collect particularly in that period; they are employed upon many other matters.

91. Will you be good enough, at your convenience, to furnish to the Committee the number of maltsters in the year 1860 and 1861, and also in the year 1867?—Yes.

92. Could you state generally the average quantity of malt that was allowed for beer exported, independently of that detail which you have put in?—The average would be two bushels to the barrel; that is to say, the strength that we generally take we should consider to be two bushels to the barrel.

93. You stated, did you not, that the reason why those malt-houses which were established for making malt for cattle-feeding were shut up was in consequence of the demand falling off?—I took the statements which were given to us; and, generally speaking, I found that, with the two or three exceptions that I named, those were the reasons which were given in the statements that were sent in for the purpose of giving up their malt-houses.

94. Do you know whether or not the demand fell off in consequence of the excessive price that was charged?—No, it is not stated so; they merely state that the demand has ceased.

95. Then as to the malting per weight, I think you stated that the loss to the revenue was something like 4 per cent., but that the quantity was something like 7 per cent.?—The quantity estimated was 7 per cent.; I think that the actual quantity has proved to be about 7 per cent.

96. Do you mean that it was the number of bushels, or the loss to the revenue was 4 per cent.?—The quantity which would be represented by the duty.

97. The cost of the collection of the malt duty is something like 3 per cent., is it not?—I think that might be taken as a fair estimate.

98. What would it be on spirits?—I could easily ascertain. It must always be an estimate, of course; but I will have an estimate made if the Committee desire to have it.

99. How comes it to pass that we see the Excise salaries so much more than 3 per cent. upon the cost of collection, being nearer 10 per cent. than 3 per cent.?—No; the collection of the whole of our revenue is not 4 per cent., but then it must be remembered that the Excise officers have a vast number of other duties to perform, which are more costly; there is the spirit duty, for instance, and the collecting of the licenses.

100. What is the import duty upon malt?—Twenty-five shillings a quarter.

101. Do you know what it was previous to the alteration in 1856?—It was prohibited before that.

102. There is no malting in bond, I presume, under any consideration, except for making spirits?—Yes, malt may be made duty free for exportation, as well as for use in distilleries.

103. When was the cider duty repealed?—At the same time as the beer duty, in 1830.

104. Will you be kind enough to let the Committee know the quantity of malt made in the spring of 1866, and the quantity of malt made in the spring of 1867?—Taking the period from the 16th of February to the 15th of May, in the year 1866, the total quantity made was 18,516,611 bushels; and in 1867, in the same period, the total quantity was 15,662,407.

105. Will you have any further returns to make for this summer?—Yes, at the end of this month there will be the completion of another round, which will be from the 15th of May to the 30th of June.

106. Will you be good enough to let us have it up to the end of this month?—Yes; we should not be able to get it in till about the middle of July; but I will get it made as soon as possible.

107. Lord *Eustace Cecil.*] Can you tell me when the malt duty was first imposed in Ireland?—In the year 1785.

108. Can you mention any periods from between 1697 and the present day, when the malt duty was repealed or diminished in England and Scotland in any way?—It was reduced after the close of the war in 1816 in England.

109. Was it reduced at any time between 1697 and 1816?—It was neither reduced nor repealed. No malt duty has ever been repealed at all between 1697 and the present time. Until the duty was fixed at 2 *s.* 7 *d.* in 1822, so far as England was concerned, they had all been increases of duty with one exception. There was a very large increase of duty made during the war, and then it went back again to what it was before the war. Otherwise there has been a gradual increase until it reached the present rate, 2 *s.* 7 *d.*

110. Has the beer duty co-existed from 1697 with the malt tax?—Yes, until 1830.

111. Without any repeal or diminution whatever?—Yes; during the whole of that time the beer duty and the malt duty have gone on together.

112. You have given us the amount of bushels manufactured in decennial periods; was the last amount that you gave, namely, 45,000,000 bushels, for a decennial period?—No, that was for a single year.

113. Could you give the Committee the amount of malt imported during decennial periods?—Yes; I have no doubt that could be given. It would be a Customs return, but I dare say I could get it for the Committee.

114. Could you ascertain also for us in what countries barley is grown, and to what extent, so that we may form some opinion as to the probable amount of barley that might come into the country?—I could not get that from any returns that belong to my own department, but it could be ascertained from the Board of Trade Returns. I will endeavour to get it for the Committee; I think I shall be able to do so.

115. You state that the malt-houses for manufacturing

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facturing malt for feeding cattle fell off owing to the want of demand; did you ever hear any opinion expressed as to the reasons why the demand fell off; was it because the agriculturists thought that malt was not efficacious for feeding cattle?—In one statement I remember, I forgot from what part of the country it came; the reason stated was that they had found that the cattle were very soon satiated with it; but with that exception, simply, the statement has been that they find that there is no more demand for it, and they propose to leave off making it.

116. Did you ever hear it stated that the malt manufactured under this particular Act was not suitable for cattle?—For feeding sheep, for example, I have heard the complaint that the Act requires it to be too finely ground; but in many instances we have relaxed that condition as far as possible, and allowed a coarser mixture to be made for the purpose of meeting that complaint.

117. Mr. *Arthur Peel.*] Was there any other cause, besides the inconvenience of the Excise regulations, that could account for the falling-off of the malt-houses worked under the Act of 1864, from 27 to four?—None, except the absence of demand.

118. In your judgment, would that cause predominate over other causes to produce a falling-off in the demand?—No. As far as those statements are concerned, it is not the case that any of them are attributed to any inconvenience arising from the Excise regulations; I have heard no complaint of that. When I say no complaint, I should say that there have been very few complaints.

119. The *O'Conor Don.*] Is it necessary that malt-houses under the Act of 1864 should take out a license?—They have to give a bond; and they have to work under particular regulations.

120. I mean, in the case of ordinary malt-houses, have they to take out a bond?—No, not unless they take credit beyond the ordinary time; then they give a bond, but otherwise they do not.

121. Do they not take out a license?—They are all licensed; it is only licensed maltsters who can work in any way either by weight or by gauge.

122. Mr. *Goschen.*] Do they apply to your department for a license?—Yes.

123. Mr. *Laing.*] Has the same process of the substitution of large for small establishments gone on in distilleries as well as malt-houses?—Yes, I think it has. The number of distilleries in England is extremely small; there are not above seven distilleries in the whole of England.

124. Did I correctly gather as the general result of your evidence, that the amount of malt consumed had remained almost stationary for more than a century prior to 1830, although the population had so largely increased?—Yes; taking those decennial periods, it is remarkable that they are nearly the same average.

125. It began at 25,000,000 bushels, and remained at 25,000,000 bushels for somewhere about 100 years?—Yes; in point of fact, up to the repeal of the beer duty in 1830, and from that time there seems to have been certainly a very great start.

126. Of course the consumption of beer per head must have been vastly smaller in 1830 than it had been 100 years previously?—No doubt.

127. In 1830 a very large reduction was made in the cost to the consumer by the repeal of the beer duty, which was nearly half the tax upon the article consumed, was it not?—Yes.

128. Since then the increase has been from 25,000,000 bushels to 45,000,000 bushels?—Yes.

129. And for the last 10 years since 1857, the amount of tax being stationary, the consumption has gone on increasing very satisfactorily?—Yes, rapidly.

130. Looking at it merely as a fiscal question, does not it seem to you that the tax is working very satisfactorily at present?—Yes, very; so far as we are concerned, certainly.

131. Is the present tax checking the increased consumption?—Apparently not.

132. And it is collected at small expense?—Yes.

133. And with but little inconvenience to the trade?—I should say with little inconvenience to the trade, because I apprehend that if you took away the duty to-morrow the process of malting would be pretty much the same as it is now. I do not think that the maltster would make any variation, and certainly no important variation, in the manner in which he prepares his malt from what he does at this moment.

134. Have you ever inquired into the consumption per head of the population, and the amount of taxation in other great beer-drinking countries, such as Germany and Belgium?—I have not.

135. Have you any means at your disposal by which you could give the Committee any information upon that head?—I think it is possible, and I will endeavour to do so.

136. The object would be to show the relative amount of consumption of beer per head of population, and the comparative incidents of taxation?—I think it is possible that it may be got at.

137. *Chairman.*] Do you know whether there was any malt at all imported last year?—I do not know; but the real fact is, that the Act allowing the importation of malt has been almost a dead letter. The differential duty between the Excise duty on malt and the Customs imported duty, I take it amounts to a prohibition.

138. Never, up to this time, has any quantity of malt been imported into this country?—Never, I believe.

139. Has much malt been exported?—Yes, a considerable quantity of malt has been exported.

140. Where to?—I believe a good deal is exported to Australia.

141. Can you tell me whether it travels well?—I believe perfectly well; in fact, if I am right in stating that large quantities are exported to Australia, I think that will prove it, because it is a pretty long voyage there.

142. Can you get us any returns which will show the quantity exported, and where it is exported to?—Yes, I think I could; I do not know whether I should be able to state where it is exported to, but I will endeavour to do so. The Board of Trade Returns will probably show it.

143. Have you ever heard it stated whether malt travels better than barley by sea?—Yes, I have always understood that barley is very liable to heat, and that malt is not exposed to the same risk in that respect.

144. The duty on beer, when the beer duty was repealed, was 10*s.* a barrel, was it not?—About that.

145. Do you know what the duty on cider was at that time; how much a gallon?—I could not tell at this moment.

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146. Sir *Edward M. Buller.*] Was not the duty on beer charged at different rates, according to the strength of the beer?—Yes, it was.

147. Were not single X, double X, and treble X, charged at three different rates of duty?—I think that was so; I was never concerned myself in the collection of the beer tax.

148. *Chairman.*] Is it not a fact that there is a great decrease per head in the quantity of malt now consumed compared with what there was some hundred years ago?—The consumption per head of population, so far as the article of beer is concerned, is, I believe, exactly the same now as it was in the year 1722.

149. Then I suppose they drank stronger beer than they do now?—That is very possible.

150. Do you suppose that that is owing to other substances such as sugar being used instead of malt for making beer?—The only other substance is sugar; latterly there has been a very large quantity of sugar used in the manufacture of beer, but until a very recent period the quantity of sugar had not been very large, generally speaking; I have had prepared an account of the quantity of sugar used by brewers from the year 1847 to 1867. In 1847, I see in pounds weight of sugar the quantity used was 8,114,736 lbs; in 1867 it was 26,532,403 lbs. But then there has been an enormous increase between last year and the present year. In the year 1866 the quantity used was 7,628,206 lbs., and in 1867, 26,532,403 lbs. The table which I will hand in gives the pounds weight in sugar, and the equivalent quantity of malt which they represent. (*The Witness delivered in the same*, vide *Appendix.*)

151. Mr. *Goschen.*] Do you think it is in consequence of any great reduction in the price of sugar this year that there has been this extraordinary increase?—There is no doubt there has been an immense demand for malt, and I think that this last year the prices of barley have ruled rather high; but I am also disposed to think that a great deal more is attributable to a new invention which has been made of a manufacture of what is called glucose sugar, which is very much used now in brewing. There has been a patent taken out for the preparation of an article of that kind, which I believe yields very well, and which is very extensively used in breweries, and is found very convenient; and that is a very considerable reason for the large increase of last year.

152. Could you tell us what amount of malt would be represented by a given amount of sugar?—We reckon 210 lbs. of sugar to a quarter of malt, so that 26,532,403 lbs. of sugar would represent 1,010,758 bushels of malt.

153. Then, in one half-year, we are to understand that sugar has been employed as an equivalent to upwards of 1,000,000 bushels of malt?—No, that would be for the whole year ended 31st of March 1867.

154. Sir *Edward M. Buller.*] What is the limitation on the consumption of sugar in brewing; is there any duty paid upon it?—Yes, there is an additional duty imposed in order to make the sugar duty equal to what would be the same duty or the equivalent quantity of malt; that is to say, taking 210 lbs. of sugar as an equivalent to a quarter of malt, you have to add so much to the Customs duty on sugar as would raise the duty to what it would be on a quarter of malt. At the present time, by the Act of the 30th of Victoria, the sugar duties having been reduced, the Excise duty of 3 *s.* 6 *d.*, in addition to the Customs duty of 8 *s.* which is the duty on the average quality of sugar that would be used in breweries, is added in order to make it equal to the malt duty.

155. Is that levied on the brewer?—Yes.

156. And does he make a return of the quantity which he consumes?—Yes, he is obliged to make a declaration as to the quantity of sugar used.

157. Then you have no control at all, have you, over the sugar which is used in private breweries?—None at all.

158. It might be used to a very large extent by them?—It might be, but I should not think it very likely. It has been very much used lately by the trade, but, as a rule, brewers do not like using sugar.

159. There is no restriction at all, is there, upon a private brewer; he may use any amount of sugar he pleases?—Yes.

160. Mr. *Goschen.*] That is to say, he may use it, but not legally?—We have no control over him, because we have no means of getting at him.

161. Mr. *G. S. Lefevre.*] Is this duty levied from the brewer?—Yes.

162. And it rests entirely upon his declaration?—Yes; he has to give notice whenever he uses sugar, and an officer takes an account of the quantity of sugar, and then 3 *s.* 6 *d.* per cwt. is added to that sugar. Notice is given 24 hours before sugar is used, and the quantity must be entered on the entry paper before it is dissolved.

163. Mr. *Goschen.*] A private brewer would have to make the same declaration as anybody else; so that if he does not pay the 3 *s.* 6 *d.* Excise duty, he is evading the law?—He would be evading the law.

164. Sir *Edward M. Buller.*] Is there any penalty for that evasion?—I do not see how it is possible to impose it; and in reference to the previous question I would call attention to the fifth section of the 30 Vict. c. 10, under which this duty is levied, where it is enacted, that "On and after the first day of May, One thousand eight hundred and sixty-seven, in lieu of the duties of excise now chargeable for and upon every hundredweight (and so in proportion for any greater or less quantity than a hundredweight) of all sugars which shall be used by any brewer of beer for sale, in the brewing or making of beer, there shall be charged and paid the excise duty of three shillings and sixpence." Therefore, that would not attach to private brewers, who consequently are at full liberty to use sugar as they please.

165. Major *Parker.*] You stated, did you not, that you did not consider that the malt duty checked the increase of consumption?—The question was put to me with reference to a table which showed a rapid increase in the consumption of malt; and my answer to that was, I think, that it would appear from that table that the malt duty had not operated as a check upon the consumption of malt.

166. You do not mean to convey the impression that, even if the duty were repealed in any degree, the consumption would not increase?—No; I did not mean to give any opinion upon that.

167. Mr. *Goschen.*] The discovery of this glucose sugar for brewing purposes might endanger the revenue to a certain extent, might it not, because

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because a private brewer might employ this glucose sugar instead of malt, and in that case the revenue would suffer *pro tanto*?—No doubt.

168. Sir *Edward M. Buller.*] Could the glucose sugar be received by the brewer at the same rate in the pound as ordinary sugar?—No, it would be different entirely; it would be all tested, to see what the quantity of saccharine matter contained in it was, and then it would be charged with duty according to that, but it is only particular qualities that would be allowed.

169. Does the glucose sugar per pound contain more saccharine matter than ordinary sugar?—No; I am not sure that there is more than one man who manufactures it in the particular way, which meets the requirements of the revenue, which is, that there should be a certain amount of saccharine matter in the article; and that is allowed by special permission to be used in breweries.

170. Mr. *Surtees.*] You stated, did you not, that the gross cost of collecting the duty was about 3 per cent.?—Yes.

171. In round figures, would not that be about 180,000 *l.*?—Yes, taking the gross duty, it would be about that.

172. Do you know why there is a differential duty on foreign malt compared with the duty on English malt?—The reason of the difference was to make it up to the cost of the manufacture here, as is done in the case of the spirit duty; there is a differential duty to make up to the manufacture in this country, the expense which he is put to by the Excise regulations.

173. Are not malt-houses obliged to be built in a particular manner and form under the Excise regulations?—Yes, and all the utensils that they use, cisterns, couch frames, and all have to be made in a particular manner.

174. Is not barley obliged to be steeped between particular hours?—Yes, it is.

175. And all barley is obliged to be steeped the same length of time, is it not?—It is not necessarily obliged to be steeped the same length of time; for instance, if a maltster wishes to sprinkle his barley after a short period, he has to keep it longer in steep, otherwise it would remain the same length of time.

176. Are there any spirits imported with the differential duty?—Yes, considerable quantities.

177. Would you be able to tell us the quantities?—Yes, I can get them for the Committee very readily; they are all published.

178. Can you give us the quantity of foreign barley that is now imported?—I suppose that could be obtained from the Customs; I do not know whether they make any distinction between the barley and other grain imported, as all grain is subject to the same duty.

179. And could you also give us the average weight of it?—That I do not know. If any officers from the Customs are examined, you can get it more correctly and better from them.

180. Mr. *Read.*] Can you, from the table which you have prepared, give us the rate of consumption of malt per head in the 10 years previous to 1830?—No, it does not go back far enough for that; but it is to be had, I believe. I rather think it has been published in one of our earlier reports; if you desire to have it, I will endeavour to get it.

181. Are you aware that the consumption has not increased much per head from 40 years ago?—I do not recollect what it was 40 years ago.

182. You do not think, do you, that the old beer tax is a fair criterion of the amount of beer consumed per head of the population?—No; because that would exclude all the private brewing.

183. You are probably aware that 100 years ago, where there is one private brewer now, there was in all probability 20?—No doubt that is so.

184. Therefore the further you go back the less value would the beer-tax returns be to show the consumption of beer?—Yes, if you relied upon the beer-tax only to show that.

185. Therefore the consumption of malt would be a better criterion?—No doubt it would.

186. Are you not aware that there is a large and an increasing trade in the export of barley to Australia as well as malt?—I was not aware of that.

187. Are the returns of brewers of the quantities of sugar which they use in brewing quite satisfactory to the Excise?—I am not aware that we have any reason to suspect that there is any duty which we lose by them.

188. Have you no other means of checking them than those you have mentioned?—They have to give notice to our officers before they use sugar; and it is placed in such a position as to be seen by the officer before it can be used, so that he has an opportunity of seeing and testing the quantity that the brewer is going to use.

189. You have no reason to suppose from those returns that there is any loss to the Excise?—I have no reason to suppose that there is any considerable loss.

190. You are aware that there was a very considerable decrease in the quantity of malt made during the high duty at the time of the Crimean war?—Yes.

191. Have you ever seen the report of the Commissioners to inquire into the operations of the Excise duties on malt in 1835?—Yes, I have.

192. You are aware that they report their opinion to be, that if the malt duty was reduced one-half, the revenue in a few years would recoup itself, if there was a good supply of barley?—I do not remember at this moment that observation.

193. That of course was in the days of protection, when there was a heavy import duty upon barley?—Quite so.

194. Would it be your opinion now in any way, that a decrease in the duty would increase the consumption of malt?—No, I should not expect any increase at all equivalent to make up the reduction of duty.

195. The differential duty which is paid by the foreigner upon the spirits which he sends us does not act as a bar to spirits being sent here?—No; because it was carefully computed, so that it should not do that, but should be a mere equivalent.

196. Is the import duty on malt more than an equivalent?—I should infer that it was, from the fact of the very small quantity of malt that is imported.

197. You are aware, are you not, that the foreigner can keep his malt for any length of time in bond in this country before he pays the duty?—Yes, no doubt that is so.

198. And he is also exempted from all restrictions of excise?—Yes.

199. He also saves the 1 *s.* a quarter duty, which he would have to pay if he sent the barley here?—Yes.

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200. The whole difference is between 21 *s.* 8 *d.* and 25 *s.*?—Yes.

201. Do you think that that acts as a bar to the importation of malt?—I merely state that as the only reason which occurs to me for the fact that such a very small quantity comes in. I know no other reason for it.

202. Sir *Edward M. Buller.*] Can you explain what is the reason why there is a difference of charge between the ordinary malt duty and the duty upon malt imported from abroad; is that owing to the restrictions which exist in this country with regard to the payment of the malt duty by the maltsters?—You will find those differential duties in the Act are stated to be to compensate the maltster in this country for the expenses to which he is put by the Excise laws.

203. Do you mean that the Excise duty of 21 *s.* 8 *d.* imposes upon the maltster a burden equal to 25 *s.*?—Yes, as compared with the foreign malt.

204. The difference would be, would it not, to his having to pay the malt duty and the interest upon the money which he pays to the Government here?—Yes, that is correct.

205. Mr. *Surtees.*] Did you not state that it was partly charged in order to compensate for the inconveniences which the maltster is subjected to by being obliged to conform to the Excise regulations?—Quite so.

206. Sir *Edward M. Buller.*] But, in point of fact, you do exact from the maltster in this country by the duty of 21 *s.* 8 *d.* as heavy a duty as you exact from the foreign maltster by the 25 *s.* duty; that is to say, the incidence of the tax is as heavy?—Yes, the difference he pays in the shape of expenses to which he is put, however those expenses are made up.

207. Then there should be a further sum added to that, should there not, in consequence of the expense of bringing the malt to this country?—That would all be included.

208. In order to sell his malt in this country, the foreign maltster must pay his 25 *s.* duty, and he must over and above that pay the expense of the carriage of the malt, to which the English maltster is not subject?—Yes.

209. So that it would appear that the English maltster bears, as the consequence of taxation, a burthen equal to 25 *s.* a quarter, plus the expense of conveying the foreign malt to this country?—I am not able to contradict that.

210. Mr. *Goschen.*] Do you really mean that he bears the burthen, or that it was supposed that he would bear the burthen when the tax was imposed?—It was supposed that he would.

211. Mr. *Read.*] Are you aware that when the 25 *s.* duty was imposed, a great number of maltsters fancied that they would be inundated with foreign malt?—Yes, I believe that was the idea.

212. But the result was, last year, that only seven quarters were imported?—It was a very small quantity: practically nothing.

213. The cost of collecting the duty, you say, is 3 per cent.; does that include the entire of the wages of the excisemen employed in collecting the duty, or only a portion of their wages, calculated according to the probable amount of time which they devote to that purpose?—It is a proportion of their time attributable to the collection of that duty.

214. Lord *Eustace Cecil.*] With regard to the glucose sugar, do you know how it is manufactured; is it manufactured from sugar alone, or from sugar in conjunction with malt or with any other substance?—I do not know what the process of manufacture is.

215. Do you know whether beer could be made from glucose sugar alone without malt?—I believe so.

216. *Chairman.*] Is it molasses?—No.

217. Lord *Eustace Cecil.*] Could you obtain some further information about how it is manufactured?—Yes, I could get that very easily.

218. Mr. *More.*] You stated that the malting process occupies 10 or 12 days; does the Excise oblige the maltster to occupy that time?—My impression is what I have stated before, that if the duty were done away with it would make very little difference, if any, in the operations of the maltster, that is to say, he would be obliged to go through the same process and occupy the same time as he does now.

219. Are you aware whether foreign maltsters take as much time as that?—I do not know that.

220. Do you remember that when Mr. Goulburn abolished the beer duty in 1829, and left the malt-tax, it caused some loss to the revenue for the next two or three years; and are you acquainted with the history of the revenue for those two or three years?—I could not tell it you in figures; but it appears from those returns which I have handed in, that the increase in the consumption of malt was enormous after the repeal of the duty.

221. When a tax is partially reduced there is generally what is called a rebound, is there not?—Almost invariably.

222. Although you think that the revenue has not suffered by the abolition of the beer-duty, would you be justified in arguing from that, that the revenue would be likely to recover itself in future years if the malt-tax were reduced by one-half?—The honourable Member's question assumes that the increased consumption of malt since 1830 has made up for the loss of the beer-duty.

223. Yes, and more than that?—I am not prepared to say that at this moment, but I can very easily ascertain that fact.

224. If you found that to be the fact, do you think you would be justified in arguing that if the tax were reduced by one-half, as Mr. Read proposed, in future years the revenue would be recouped for that loss, and recover itself to the same extent as it has done since the beer-duty was abolished?—When I was answering that question I was adverting to what would be the effect upon the consumption of beer by the alteration of the duty. If the repeal of the duty did not make any material difference in the price of beer, I do not see upon what basis you could recover your duty by increased consumption, to that extent at all events.

225. Of course as the population increases the consumption is likely to increase?—Yes, but not at all in that ratio. I meant by that answer to convey that you must so decrease your duty, it seems to me, as to encourage consumption, and the consumption of malt would be only in the shape of beer.

226. In countries where there is no malt tax, beer is sold very much cheaper than it is in England, is it not?—Yes, very much.

227. Surely, then, the result of reducing the tax would be a lessening of the price of beer, would it not?—Not unless you reduce the duty

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to such an amount as will make an appreciable difference in the price of beer. If you swept away the whole of the malt tax, no doubt it would be so.

228. But it would lessen the price of beer if it were reduced by one-half, would it not?—The answer to that question depends upon what amount is involved in the price of beer for the malt duty.

229. Mr. *G. S. Lefevre.*] You have no means, have you, of checking the returns of brewers as to the use of sugar?—Yes, we do check it. They are obliged to give notice whenever they have to make use of sugar, and we take an account of the sugar they use.

230. You have Excise officers appointed for this purpose?—Yes, we have.

231. And you have no reason to believe that there is any evasion?—We know that in some instances there have been evasions; but I do not think we have any reason to suppose that it is carried on to any very great extent.

232. *Chairman.*] Do you recollect in what year the hop duties were repealed?—In 1862.

233. What was substituted in lieu of the hop duties?—There was an addition made to brewers' licenses.

234. Do you know what that addition was?—I think it was assumed that two pounds of hops were used in a barrel of beer; it was taken at 3 *d.* to each barrel of beer.

235. Do you know how much revenue that 3 *d.* a bushel raises, which is equivalent to the average of the hop duty?—The annual average of the hop duty and brewers' licenses combined was 452,461 *l.* That of the brewers' licenses since the repeal of the hop duty has been 372,416 *l.* The last year's duty was 443,080 *l.*

236. Is that addition felt to press heavily upon the brewers?—I never heard any complaint that it has been done so.

237. Do you know what the brewers' licenses, as a whole, are per barrel?—I will put in a paper, stating what the rates are.

238. Mr. *Surtees.*] Are you aware whether there is any difference in the manner in which it is considered desirable to malt barley for feeding purposes as compared with brewing purposes?—I am not aware of that.

239. Sir *Edward M. Buller.*] Barley may be steeped for feeding purposes, may it not, without the payment of duty, provided it is not dried?—Provided it is not allowed to germinate.

240. Lord *Eustace Cecil.*] The moment it germinates you exact a duty?—Yes, we look upon it then as in process of malting.

241. Mr. *Goschen.*] Have you any calculations in your department which will show the aggregate amount of duty paid on a quart of beer, taking the malt tax and the brewers' license together?—I can tell you what we estimate the malt duty at, but the malt duty and the brewers' license together I cannot tell at this moment.

242. At what do you estimate the malt tax alone?—What I consider a fair estimate would be about 2 *d.* a gallon.

243. *Chairman.*] That is simply the tax itself, and not the increase of price with regard to that tax; you mean that it is the *bonâ fide* tax itself upon each gallon of beer?—That is what we consider that the malt tax adds to the price of beer exclusive of the license.

244. Mr. *Goschen.*] The Chairman asked you what it adds to the cost of beer; my question was as to the amount contributed to the revenue; is the 2 *d.* per gallon the actual amount contributed to the revenue on your estimate of the license in price?—I consider that the increase in the price of beer due to the operation of the malt duty is 2 *d.* a gallon.

245. Sir *Edward M. Buller.*] That of course depends upon the quality of the beer; you form that calculation upon so many gallons of beer made from so much malt?—Yes, upon what we consider a fair average; two bushels to the barrel.

246. They may make beer from two bushels of malt per barrel or four bushels of malt per barrel or even more, may they not?—Yes, or even less.

247. With London brewers in the proportion two bushels to a barrel?—Two bushels and a-third we find to be the average with regard to export beer, there being 36 gallons in the barrel.

248. Mr. *Read.*] What per-centage do you suppose 2 *d.* per gallon is upon the price of beer; is it more than 12½ per cent.?—We may take the average price of beer sold to be 1 *s.* per gallon.

249. Lord *Eustace Cecil.*] Should you say that the average price of beer was increased or diminished by the substitution of brewers' licenses for the hop duty in 1862?—I do not think it made any difference.

250. Mr. *More.*] They could not raise the price of their beer to that extent, could they?—They have latterly.

251. They could not in consequence of the mere increase of the tax of 3 *d.* a gallon raise their price?—No.

252. Lord *Eustace Cecil.*] But they did not diminish it?—No.

253. *Chairman.*] Could you give us the amount of duty collected upon hops for the last three years of the existence of the tax, and the amount collected by the increase of brewers' licenses up to the present time?—Yes; I will furnish that information to the Committee.

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254. *Chairman.*] I BELIEVE you are in the Board of Inland Revenue?—I am in the service of the Inland Revenue.

255. Are you the Chief Surveying General Examiner?—Yes.

256. How long have you been in that position?—I have been about four years in that position.

257. In what position were you before then?—I was Surveying General Examiner for 16 years before that.

258. And before that what was your position?—A Supervisor of Inland Revenue.

259. Therefore, you are probably as much conversant with the malt tax as any one that we could examine?—I think so.

260. How long has it been your special duty to examine into the malt tax question?—It is not only malt, but the whole Excise revenue that I have to attend to.

261. The malt tax has specially come under

your notice for a great number of years?—Yes; ever since I entered the service, 41 years ago.

262. Then you perfectly well recollect when there was a beer duty concurrent with the malt duty?—Yes, I do.

263. What year was it when you first entered the service?—In 1826.

264. Can you state what the malt duty and the beer duty were in 1826, and also the malt duty and the beer duty in 1830, when the beer duty was repealed?—The malt duty in 1826 was, 4,177,277 *l.*; the beer duty, 3,345,372 *l.* In 1830 the malt duty was 4,231,997 *l.*, and the beer duty 1,825,972 *l.* up to October, when it was repealed.

265. And also the amount of the cider duty during that period?—The cider duty in 1826 was 28,277 *l.*; in 1830 it was 42,930 *l.*

266. Could you give the Committee any information about the cider duty; do you recollect its collection?—Yes; the duty was charged upon it when it was received into the publican's premises; it was not charged upon the maker.

267. Do you know how much it was per gallon?—About threepence.

268. And was private cider making charged or not?—No.

269. How does the malt tax generally now come before your notice in your department?—We have to superintend the whole of the regulations as to charging, and sending the officers to survey and check in the different parts of the country.

270. I presume you heard what Mr. Stephenson said with regard to 1 *d.* per bushel being the cost of collection; is it your opinion that 1 *d.* per bushel is a fair sum to put as the cost of the collection of the malt duty?—I think it is.

271. In what way does the amount rise to so large a sum with regard to the collection of the revenue?—I think there must be some mistake in taking the sum so large as it is taken; because the per-centage of collecting the whole revenue is but 3 *l.* per cent. and a fraction.

272. Mr. Stephenson stated, did he not, that this 6 per cent. is only 3 per cent. upon malt?—It is only about 3 per cent. for the whole of the Inland Revenue, in fact.

273. Is the malt duty as easily collected as any other duty in the Excise Department?—I think it is more easily collected than almost any.

274. Why do you consider it to be more easily collected?—It is in so few hands, for one thing.

275. When you first entered the Inland Revenue, were there not a great number more malt-houses and maltsters than there are at present?—Yes, there were.

276. How do you account for the diminution in the number of malt-houses and maltsters?—Partly from the operation of capital inducing people to enter into a large way of business, and partly, as Mr. Stephenson stated, from the erection of large houses by the sides of the railways; and many brewers since there has been a demand for a good article have themselves made their own malt in large quantities, whereas formerly they bought it of little country maltsters who were also farmers.

277. Do you think that there were more private people who brewed in those days than is the the case at the present time?—Yes, I think perhaps there were rather more; but it is only an opinion.

278. Do you not think that the malt credit has had something to do with the diminution of the number of maltsters and malt-houses?—I think not. The diminution has been gradual for a great many years past. The number has been regularly decreasing, in fact, and at the time that the credits were decreased I think that there was no difference.

279. Do you think that the revenue is collected without much fraud or evasion, so far as you know?—I have reason to think that it is.

280. If it were not, I presume, in your position, you would be able to form a very fair opinion upon that point?—Yes.

281. The Committee have had from Mr. Stephenson, the present number of malt-houses in the kingdom; can you give us that information as well?—The number of malt-houses in the year 1832 was 13,755.

282. What were they in 1835?—In 1835 there were 14,149.

283. It was in 1835, was it not, that the inquiry was made into the Excise establishments?—It was.

284. And from that time to the present they have been gradually decreasing?—Yes, they have.

285. What is the number of malt-houses at the present time?—9,703.

286. Do you know anything with regard to the drawbacks of the malt duty on beer exported?—Yes.

287. Does that come under your supervision in any way?—We have to examine the samples of beer exported to see that they are of the proper gravity, and that the drawback is calculated correctly, which is calculated upon the gravity of the beer exported.

288. Is it the better class of beer that is generally exported, or an inferior class of beer?—Middling; there are quantities of each.

289. Do you know anything with regard to the working of Mr. Gladstone's Act for allowing malt to be made duty free for the feeding of animals?—Yes.

290. Can you state to the Committee why it has not been successful?—The general opinion is that it did not answer the expectations of the people who made it. The general impression is, that it was very much over-praised, and that malt is more useful as a condiment than as food.

291. With regard to the effect of the law allowing duty to be charged according to the weight of the barley, has that come under your special notice?—Yes.

292. Can you state what is the average weight of the barley that has been used?—50 2-5ths of a lb. per bushel.

293. What has been the quantity charged?—The first year it was 2,229,161 bushels.

294. How much was it last year?—3,792,742 bushels.

295. In what year was the Act passed?—The 28th & 29th Victoria, the year before last.

296. Do you know whether it was British grown or imported barley?—From inquiries which we made, we believe it was imported barley at Dublin, Edinburgh, and London, but chiefly home grown in other places; but there are no means of ascertaining precisely the quantities.

297. Mr. *Goschen.*] Do you see any connection between the inquiry in 1835 into the Excise establishments,

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blishments, and the diminution of the number of maltsters that took place soon after that inquiry?—I do not see any connection.

298. Were there any variations made at that time which might have led to the diminution in the number of maltsters?—No, I cannot think of any that had relation to it.

299. As far as you know, it is simply a coincidence that there was an inquiry in that year, and a subsequent diminution in the number of maltsters?—Yes.

300. With regard to Mr. Gladstone's Act, as to malt being made for the food of cattle, you state that it was over-praised, and did not answer people's expectation; do you think that it did not answer the expectation owing to a defect in the law, or because it was thought that malt was used more for food for cattle than it turned out to be?—I think that that was the reason; it was expected to do a great deal more than it has done in feeding cattle; the experiment was a failure.

301. It was thought before that, that barley was more used as a food for cattle than it turned out was actually the case?—Yes.

302. Then, in fact, it would appear that the grievance had been exaggerated?—I think so.

303. With regard to the malt tax itself, what are the inconveniences to the maltsters from the collection and incidence of the tax?—They are restricted to the hours of wetting. They must wet by day, and they must continue it in steep a certain time, and they must also put it into a certain vessel called a couch frame to remain a certain time.

304. Do those restrictions in your judgment operate, or do they not operate, in the direction of compelling the maltsters to go through processes which they would not be obliged to undertake if there were no duty?—They must follow almost the same process, even if there were no duty; perhaps it might make a trifling difference.

305. Does it increase the cost of their establishment?—A very little indeed, because one man is generally fully employed in working, and if they make more malt in the same period they must employ more men.

306. Does it affect small establishments more than it does large ones?—I can hardly say that, perhaps it does a little.

307. Do you think that the large maltsters can get over the restrictions more easily than the small ones?—No, not that they can get over the restrictions, but that they do not affect them so much in their working.

308. They do not weigh so heavily upon them?—No.

309. For a small maltster it would be more convenient, would it not, to be left free to choose his own time?—Yes, I dare say it would.

310. What quantity of barley would a large maltster steep at the same time as compared with a small one?—They vary from a few bushels up to 250 quarters in one steep.

311. With regard to the taxes generally, are they generally the more economically collected the nearer you go to the fountain head, that is to say, the more you tax the first operations?—Yes, I think undoubtedly it is so.

312. If you had to collect the tax from the subsequent process it would lead to greater expense in the collection?—Yes, and it would lead to more than that, because it would be objectionable in other respects; it would interfere with more people.

313. Therefore such a mode of collection would impose restrictions upon a greater number of persons?—Yes, and also it would be more subject to evasion.

314. The more you extended it the more probability there would be of evasion?—I think so.

315. Is the license tax an economical tax, and easily collected?—It is very easily collected.

316. And it is impossible to evade it, is it not?—It cannot be readily evaded, because the officers travel all over the country; I presume that the question has reference to licenses generally. The officers are stationed all over the country, and they soon find out if a man is selling without a license, or acting in any way without a license.

317. Has the substitution of the license duty for the hop duty given general satisfaction?—Not to the small brewers perhaps.

318. Though the license duty is a very economical duty, and cannot be evaded, its incidence is not, perhaps, so just as the incidence of the tax according to the quantity produced?—It is not, because we must charge according to the malt brewed, and not according to the actual quantity of hops used, so that one brewer using a large quantity of hops, and another using a very small quantity, would each pay the same rate of license.

319. Are there complaints on the part of the small brewers that the license tax operates to their disadvantage as compared with the larger brewers?—It has not been made publicly; they have merely said that they wished that it had remained as before; the small brewers do not like the trouble of paying in that way.

320. Do the large brewers hold the same language?—No, I fancy not, as far as I have heard.

321. In the same way as the malt tax interferes rather more with small brewers than it does with large brewers, so the license tax interferes rather more with the small brewers than it does with the large ones?—Yes, I think it does.

322. Generally in taxation you find, do you not, that it interferes with those who conduct operations on a small scale rather than with those who conduct them on a large scale?—I am of that opinion.

323. With regard to private brewers, I mean those who brew for themselves, did the substitution of a license duty for the hop duty relieve them altogether?—It relieved them of the hop duty.

324. Then it was a distinct advantage to them?—Yes.

325. They ceased to pay the duty upon hops, and they do not pay towards the licenses?—Yes, that is so.

326. In the same way the tax upon the use of the glucose sugar that we have heard of operates to the advantage of the private brewer as against the public brewers?—I do not think any private individual would use glucose sugar.

327. What is the article?—It is, in fact, ordinary sugar converted into grape sugar.

328. What is the difference between ordinary sugar and grape sugar?—There is a chemical distinction. The process of fermentation converts ordinary sugar into grape sugar first.

329. Lord *Eustace Cecil.*] Is it purer than ordinary sugar?—No, it is a different description of sugar; there is a chemical change in it.

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330. Mr. *Goschen.*] It has been stated that the cider duties used to be collected upon the premises of the publicans; would it not be almost impossible to collect duties in such a manner now?—Yes; unless we can have, as we had at that time, almost daily visits to the publicans.

331. Has there been an immense increase in the number of public-houses in proportion to the population since the abolition of the cider duty?—Public houses have increased very considerably.

332. I am speaking of public-houses and beershops; has there been an increase in the number of places which you would have to superintend?—Yes, they have increased very much.

333. On the other hand, has the Excise establishment increased or decreased?—That has decreased very considerably.

334. Would it be possible for you, except at an enormous expense, to superintend the goods taken into all the various beershops and public houses?—No, it would cause a very large expense indeed.

335. Can you form any estimate whatever as to the proportion of malt consumed by private brewers, as compared with the aggregate consumed by public brewers?—We can only estimate from what remains, that what is not entered by brewers is brewed by the private brewers. We suppose a certain quantity to be used by brewers, and a certain quantity by distillers, and a certain quantity by vinegar makers, and yeast makers, and the balance we suppose to be used by private brewers.

336. Has any paper been handed in by which we shall be able to see that?—No, I think not.

337. Shall we be able to have any detail of the estimate made in your department with regard to the quantity used in the course of a year by private brewers?—I will endeavour to obtain that; I think we can prepare it.

338. Has private brewing decreased very much?—I am quite unable to say; but I should think it has, since there has been such an improvement in the brewing beer of late years.

339. I understood you to say, in reply to the Chairman, that there were more small brewers in former days than there are now?—Yes.

340. I did not quite understand whether that meant private brewers or small licensed brewers?—Small licensed brewers; they have diminished in number in the same way, though not in the same proportion, that the malsters have.

341. Do you attribute that to the same causes?—Yes.

342. Do you think that the malt tax has had anything to do with the diminution in the number of brewers?—I think not.

343. Has the quality of the beer produced by the large brewers had anything to do with it?—That is the chief reason, I believe.

344. Does a maltster manufacturing on a large scale produce better malt than a small maltster?—Much better, as a rule; there is more skill brought to bear upon it.

345. As a rule, a large brewer produces better beer than a small brewer?—Yes.

346. Therefore, the custom goes rather to the large brewer than to the small brewer?—I think so.

347. And that leads to a diminution by degrees in the number of brewers?—Yes.

348. Did you hear Mr. Stephenson's estimate of the amount of duty paid on a gallon of beer?—I think he said it was about 2 *d.* or 2¼ *d.*

349. Are you acquainted with the calculations by which he arrived at that figure?—The average price of barley purchased for the last 10 years is taken at 1 *l.* 18 *s.* 3 *d.* per quarter; the cost of making that into malt is 4 *s.* 6 *d.*, the duty 1 *l.* 1 *s.* 9 *d.*, and 10 lbs. of hops per quarter, would be 12 *s.* 6 *d.*, and the average expense of brewing and selling, and all connected with it, is 1 *l.* 7 *s.*

350. Mr. *Read.*] Is that retailing as well as brewing?—No; this is the expense of brewing wholesale, the total being 5 *l.* 4 *s.*, and the duty is just 21 per cent. of the cost price.

351. Mr. *Goschen.*] That is up to the time when the brewer has completed his operations?—Yes.

352. It does not include the brewer's profits?—No, it is the cost without his profits. Beer of ordinary quality is sold at 36 *s.* a barrel, or 1 *s.* a gallon. I mention that to show the per-centage of the malt tax upon the cost.

353. This is not the calculation which gives you 2 *d.* a gallon?—No, that is a different calculation. Beer of ordinary quality is sold at 36 *s.* a barrel, or 1 *s.* a gallon; and 21 per cent. upon 36 *s.* is 7 *s.* 6 *d.*, or 2¼ *d.* a gallon.

354. Sir *Edward M. Buller.*] Can you give us any account how you bring up the expenses to 1 *l.* 7 *s.*?—Those items which I have given are taken from a brewer's books, with his own consent.

355. Lord *Eustace Cecil.*] Is it from a number of brewers, or merely from one brewer?—From one brewer.

356. Mr. *Goschen.*] When you say that a gallon of beer costs 1 *s.*, you mean that that is the price, and not the cost?—That is the selling price.

357. So that in your 2¼ *d.* you have already taken into consideration the per-centage of the selling price, in the same way as you take the per-centage upon the cost price?—Yes.

358. Therefore your 2¼ *d.* will include the proportionate difference between the selling price and the cost price?—Yes.

359. And the 2¼ *d.* which is added to the price of the beer does not represent the actual amount of duty paid on the beer, but the proportion of the duty to the cost?—Yes.

360. Sir *Edward M. Buller.*] If you take the price of barley, we will say at 1 *l.* 18 *s.* 3 *d.*, and the cost of making it into malt at 4 *s.* 6 *d.*, that would make the expense of a quarter of malt 2 *l.* 2 *s.* 9 *d.*; then your duty is 1 *l.* 1 *s.* 9 *d.*, and that 1 *l.* 1 *s.* 9 *d.* is more than 50 per cent. upon the original cost price of the barley?—Yes, upon the original cost price of the barley it would be so; the estimate includes plant, horses, casks, wages, insurances, and losses.

361. Mr. *Goscken.*] If you take the total cost of a quarter of malt at 5 *l.* odd, what would that give as the cost of a barrel of beer?—A quarter of malt would make about four barrels of ordinary beer.

362. How much would fall upon each barrel?—It would be 1 *l.* 6 *s.*

363. Sir *Edward M. Buller.*] That would show that if beer were sold at 1 *s.* a gallon the profit of the man who retailed it would only be 10 *s.* a barrel?—Yes.

364. Mr. *Goschen.*] One pound six shillings is the original cost of a barrel of beer?—Yes.

365. If the selling price is 1 *l.* 16 *s.*, 10 *s.* would represent the profit of the brewer but not the

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the retail seller, or any intermediate parties?—Of the brewer and the retailer.

366. That would be 10 *s.* upon 1 *l.* 6 *s.*, which would be how much per cent?—About 40 per cent.; that is the profit of the brewer and the retailer.

367. Is 1 *s.* per gallon the selling price to the actual consumer?—That is the selling price by the brewer to the publican at 1*s.* per gallon wholesale, but that is not the retail price.

368. Is this selling price of 36 *s.* the average price, or is it the price at present?—It is the average price of this quality of beer.

369. Is it a calculation in your department that there is difference of 10 *s.* between the cost of beer to the brewer and the selling price to the public?—Yes, in beer of fine quality.

370. Has it presented itself to you before in that light, or does it merely result from your comparison of the two statements?—I did not observe the difference before, but I consider that the 10*s.* is the profit on a barrel.

371. There would be the interest of the money invested in the brewery, the repairs of machinery, repairs of the boilers, and all that kind of thing, and the question is whether that would be included in the cost of 1 *l.* 7 *s.*?—All that would be included in the original cost; the other would be the profit out of it.

372. If it should be found that 1 *l.* 7 *s.* is too high, and that it would be reduced to a lower figure, then the profits of the brewer would be still greater?—Yes.

373. Sir *Edward M. Buller.*] Would the beer which you have spoken of be beer of the ordinary quality, about the strength of ordinary London porter?—Yes, it would be.

374. But you are aware that as you increase the strength of your beer the incidence of taxation becomes heavier, does it not?—Yes, it does, on the price per gallon.

375. Hops being the same price, inasmuch as you take more bushels of malt, of course your taxation is heavier upon the higher quality of beer than upon beer of inferior quality?—No doubt about it.

376. You are probably aware that it is not at all uncommon in the country to brew as much as eight and even ten bushels of malt to the hogshead, which would be about as much as two barrels; and, therefore, the excise duty would fall with at least double weight upon that kind of beer, would it not?—Yes, it would, but such beer is seldom sold.

377. With regard to those expenses, have you no means of explaining to us of what they consist?—No, I have not.

378. Are you not aware that the expenses of brewing when you have got the plant are little more than the fuel, and the attendance of the person who watches the beer?—There are many incidental expenses besides that, I think.

379. Mr. *Goschen.*] Is the 1 *l.* 7*s.* derived from the statement of the one brewer, or is it a calculation?—It is a statement of one brewer taken from his books.

380. Colonel *Duncombe.*] You remember the time when there was a tax upon beer and a tax upon malt?—Yes.

381. Which, in your opinion, was the easiest tax to collect?—The malt tax, undoubtedly.

382. Will you state the reasons why you consider that an easier tax to collect?—First, because there were so few people from whom it was collected, and the attendance was so little to charge the duty on the malt, that one officer could survey a great many more maltsters than he could brewers.

383. It would arise chiefly from the greater necessity for supervision?—There must be a great many more officers employed to visit those places.

384. Taking a given quantity of malt, and a given quantity of beer, those quantities being always equal, the amount of tax collected upon each, therefore, would be very much the same, would it not?—But there would be so many more brewers to visit; there would be double the number of brewers, and therefore a greater amount of inspection.

385. You agree in opinion with Mr. Stephenson, that the number of evasions are very few?—I think the malt evasions very few on the whole.

386. Could you give the Committee a return of the number of convictions, say during the last 10 years?—In the last 10 years there have been in England 186 convictions, in Scotland 11, and in Ireland 27, making 224 altogether.

387. Does that refer to convictions on unlicensed persons?—No, upon licensed persons.

388. Were there no convictions upon unlicensed persons?—I dare say there were scarcely any for malt, or very few indeed; they are mostly upon licensed malsters.

389. You mean licensed people who have got malt into the market without the payment of duty?—Yes.

390. With regard to Mr. Gladstone's Act, you state that it has been, comparatively speaking, a failure, because the malt was not adapted for the food of cattle; have you never heard that farmers did not use it very much in consequence of the very great price; that the places where it was prepared as food were so distant one from the other, that the carriage and expenses of that sort make the price almost too high for them to use it profitably?—I think that that was one reason.

391. It was not altogether that the food was unfit for cattle, but the price was too high for the farmers?—Yes.

392. Can you tell us how many farmers erected malting-houses for producing this malt?—I do not think that any farmers did so.

393. You mean that no occupier of land did?—I do not think that any farmer who made malt would enter into that manufacture.

394. Therefore they had to carry this food from the maltsters in the large towns from those 27 malt-houses?—Yes.

395. Therefore in those cases those who did use it had to send a very great way for it?—Yes.

396. And therefore that very considerably enhanced the price?—Yes.

397. Major *Parker.*] It has been stated by Mr. Stephenson, that beer is not unfrequently made from glucose sugar alone; are you aware whether that is the fact or not?—I do not think it is made from it alone; it may be.

398. Are you aware that 26,000,000 lbs. of glucose sugar were used in one year?—That is not glucose sugar; that is ordinary sugar, including the whole of the sugar used.

399. Do you know what relative value is attached by brewers to sugar and malt in the preparation of beer?—A brewer would always use malt in preference to sugar if he could get it at the same price.

400. To put it in another form, Mr. Stephenson has stated to the Committee that 210 lbs. of ordinary sugar is equal to a quarter of malt; is it your opinion that if the duty were taken off malt, those 26,000,000 lbs. of sugar would not have been used, or would not in future years be used for the brewing of beer?—I do not think it would make very much difference if there was a proportionate duty charged on the sugar.

401. I thought you stated before that malt was preferable to sugar, and that sugar would not be used if malt could be had?—I mean that it would not be used if malt could be had as cheaply.

402. You have stated, have you not, that 1 *l.* 7 *s.*, including expenses, is the cost of brewing a quarter of malt?—Yes.

403. At what do you value the grains and yeast which arise from the brewing?—I have not the particulars, they were only given in bulk by a brewer.

404. Have you any idea as to the value arising from the yeast and the grains?—The value is very different in different localities, and I am not able to state what it is.

405. Mr. *Surtees.*] You have mentioned that the malt houses have decreased in number from 14,149 to 9,703?—Yes.

406. Has the diminution been principally in the larger malt houses, or the smaller ones?—In the smaller ones.

407. Did not the diminution of time, in the malt credits, affect the small maltsters?—No, I think not materially.

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408. What was the utmost length of time allowed formerly for credit?—Eighteen weeks.

409. Was that the longest time that was ever granted?—Yes.

410. And what was the shortest length of time at the period when 18 weeks were allowed?—The duty then became payable within an average of perhaps a fortnight or three weeks after the close of the round.

411. But the longest time, as I understand you, which was allowed at the time to which you are alluding was 18 weeks?—Yes.

412. What was the shortest time then?—They gave a bond for 18 weeks.

413. What bond was that?—A bond was given for the credit. They were required to pay ready money immediately after making up the accounts, unless a bond was given for the credit.

414. There was no credit given unless a bond was given?—No; the maltster was required to pay all his duty off within six weeks.

415. But if he gave a bond he might have 18 weeks?—Yes.

416. Now if he gives a bond how much time is he allowed?—Six weeks; but on paying interest at 3½ *l.* per cent. credit is extended for a portion of the year to 18 weeks, the longest time.

417. *Chairman.*] Will you furnish the Committee with a return of the average price of malt for the last 10 years?—Yes, I will have it prepared for the Committee, if it can be obtained.

Thursday, 27*th June* 1867.

MEMBERS PRESENT.

Mr. Ayrton.
Colonel Barttelot.
Sir Edward Manningham Buller.
Mr. Stephen Cave.
Lord Eustace Cecil.
Mr. Dent.
Colonel Duncombe.
Mr. Goschen.
Mr. Hardcastle.
Mr. Hunt.
Mr. Shaw Lefevre.
Mr. More.
The O'Conor Don.
Major Parker.
Mr. Arthur Peel.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

WILLIAM CARLING, Esq., called in; and further Examined.

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418. *Chairman.*] HAVE you been able to get the return which I asked you for, showing the average price of malt for the last 10 years?—I have not been able to get it yet. Malt is not in the Board of Trade Returns, it is only grain unmalted that they return.

419. I think you were also to get us the average for the last three years of the duty upon hops, and the amount of the brewer's licences during the years that have succeeded the repeal of the hop duty up to the present time?—Yes; I have had that taken out since 1852, as I thought it might be useful. (*The same was delivered in*, vide *Appendix*.) I have also a return of the number of malt houses and maltsters in the United Kingdom since the year 1832. (*The same was delivered in*, vide *Appendix*.)

420. You did state, I think, that the diminution of the malt houses was not occasioned by the shortening of the malt credit?—It was not, apparently.

421. Mr. *Surtees.*] Do you know whether it is permitted by the excise law to dry sweeds or mangold wurtzel on malt kilns?—Since the chicory duty has been levied in England, that has been objected to.

422. It is not permitted then?—It is not unless it has been allowed by special indulgence.

423. For what reason is it not allowed?—It would interfere with the use of chicory as a substitute for it.

424. Mr. *Dent.*] With respect to drying sweeds and mangold wurtzel, for what purpose would they be used?—They might be used as a substitute for chicory.

425. Mr. *Read.*] Was there a great decrease in the expenses of the Excise when the beer duty was repealed in 1830?—There was a considerable decrease.

426. You tell us that the cost of collecting the malt duty is now about three per cent.?—Yes.

427. I see that the estimate this year for the excise is 1,300,000 *l.*?—That includes the whole expenses of the Inland Revenue.

428. What are the receipts of the Inland Revenue?—Nearly 40,000,000.

429. I am not speaking of the Customs, you understand?—No, the excise; stamps, taxes, income tax, and assessed taxes.

430. Independently of the Customs, and confining yourself to the Inland Revenue, you say that the Inland Revenue is 40,000,000 *l.*?—I think it is very nearly that.

431. What are the Customs?—The Customs are about 20,000,000; 18,000,000 *l.* to 20,000,000 *l.*; there is a very much larger income derived from the Inland Revenue than from the Customs.

432. According to your statement, it costs only 1,300,000 *l.* to collect 40,000,000 *l.*?—I gave that figure by a guess.

433. And on the other hand, it costs 800,000 *l.* to collect 20,000,000 *l.* in the Customs?—Yes.

434. Then the excise is much less expensive than the Customs?—I think it is rather less, not very much.

435. Did not a great number of small maltsters trade on the Government credit before that credit was shortened to six weeks?—It would not appear that many did from the small diminution in the number of maltsters that took place.

436. Would there be any difficulty in ascertaining from the excise what sort of barley was malted; I mean where it grew?—Yes, I think there would; it would be only an estimate.

437. I do not mean with regard to what has taken place in the past, but from henceforth would there be any difficulty?—Unless the law was altered there would.

438. All sorts of barley, I believe, have by regulations of the excise to be steeped a certain time?—Yes, they have.

439. Do you think that all maltsters wish that for all sorts of barley?—I think that, as a whole, the maltsters would not wish the time shortened.

440. But would they wish to have liberty for variations in steeping it?—I think not from what those have said whom I have had conversation with.

441. What are the duties of the Excise-man in breweries?—To see that the brewer enters the proper quantity of malt that he is about to brew on the paper left for the purpose; and to see that no improper ingredients are used.

442. Then he has access to the breweries now?—He has.

443. At

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443. At all times?—At all times.

444. If he had to collect a beer tax he would be no more annoyance to the brewer than now, would he?—He would have to visit him very much more frequently.

445. But the maltster would escape these visitations?—The maltster would.

446. I think you said that the cost of brewing a quarter of malt was 1 *l.* 7 *s.*?—Yes.

447. I think you made the cost of the beer in the brewery 26 *s.*, and you said the brewer sold it at 36 *s.*?—The brewer would brew about 3½ barrels of beer at the price I estimated, 36 *s.* a barrel.

448. What would be the cost of brewing a quarter of malt and the requisite hops?—The total cost would be 5 *l.* 4 *s.*: the price of the barley, and of the hops, and the making into malt, with the duty.

449. If he sold at 1 *s.* a gallon, you said his profits would be something like 1 *l.* 2 *s.*?—About 1 *l.* 2 *s.*

450. So that the cost of the brewing and the profit to the brewer make 3 *l.* 7 *s.* on that one quarter of barley?—About 22 per cent. would be the profit.

451. In fact, the price of the barley and of the hops has very little to do with the price of the beer?—Yes, it has.

452. What do you put down the price of barley at?—£. 1. 18 *s.* 3 *d.*

453. How did you get at that figure?—It was furnished by a firm who have purchased it for the last 10 years.

454. It is not supposed to represent the average price of barley, is it?—The average of that which they purchased.

455. The average price of barley would be something like 32 *s.*, would it not?—It would, taking all kinds.

456. Mr. Goschen asked you whether it would not be a very great inconvenience to the exciseman to have to inspect all the goods that the publican received?—It would.

457. Under what circumstances would he want to do that?—Only in the case of sugar.

458. I am not talking of the brewer, but of the publican; Mr. Goschen put to you, that it would be a very great hardship and additional expense that all the goods the publican received should be inspected by the excise?—There would be no necessity for that; I did not understand that to be the question.

459. Not under any circumstances would that be necessary?—Not under any circumstances.

460. I asked Mr. Stephenson a question about the employment of the excise; he said that there is hardly any malt made from May to October; and I asked him what the excise were employed in during those leisure months, and he was good enough to tell me this—"There are some duties upon which they are employed to collect, particularly at that period;" will you be kind enough to define that; he meant in the rural districts, I take it?—Yes; the licenses fall due at that time of the year (for tea, for instance), and they are very numerous.

461. So the excise are now pretty well employed throughout the whole year, are they?—They are not so thoroughly employed in the summer as they are in the winter, still they are well employed, and particularly recently, since we have had to collect statistics for the Board of Trade, and also the dog tax, which has been transferred to us; these will keep us very fully employed.

462. Mr. *More.*] You were in the Inland Revenue before the tax upon beer was repealed, were you not?—Yes.

463. What consideration, in your opinion, induced Mr. Goulburn to repeal the tax upon beer instead of the tax upon malt?—The reason given was simply and solely because the poor man paid the duty, which the rich man did not.

464. Do you mean that that was the stock argument used by the public?—It was used in the House, and it was also used by Sir Robert Peel some years afterwards in a debate on the malt tax.

465. What consideration connected with excise or inland revenue would have induced a Minister to repeal the tax upon beer, rather than the tax upon malt?—I think there had been very great complaints of the adulteration of beer, and of the monopoly of the brewers.

466. Then the consideration of its being easier to collect one tax than the other did not influence him?—I am not aware that it did.

467. Would you think it fair to assume, from the small advantage that seems to have been taken of malt for feeding purposes since Mr. Gladstone's Bill, that farmers generally do not approve of it for feeding purposes, or that the malt and linseed mixture provided by that Bill is not what they care to use?—I think the latter may be the reason.

468. You think that it is not just to argue from the alleged failure of that Bill that malt is not generally approved of by the farmers for feeding purposes?—It is difficult for me to form an opinion upon that subject.

469. Mr. *Arthur Peel.*] We were told that the tendency of things was to concentrate the number of these small malting houses into large ones?—Yes.

470. Have you any means of classifying the maltsters, stating whether they have independent establishments, or are in connection with the farmers farming their own land?—We can show the quantities used by the principal maltsters, and the quantities used by the principal brewers, but I do not think that we can show what you suggest.

471. Mr. *Dent.*] With respect to the question put to you about malt for feeding cattle, should you say from personal knowledge that the mixture of malt and linseed has been complained of by the farmers?—I have not heard any complaint, but in fact I have not had an opportunity of hearing it spoken of.

472. You could not say from your own personal knowledge that it was the high price of the compound that deterred the farmers from using it?—I could not say that.

473. You have no practical knowledge on that subject?—No.

474. With respect to a question put to you by the honourable Member for Norfolk, what do you include in the Inland Revenue?—Excise, stamps, income and assessed taxes.

475. In fact the bulk of the revenue except the Customs?—Yes.

476. *Chairman.*] I understand you to say that you have no knowledge of the operation of Mr. Gladstone's Act with regard to malt for feeding cattle, except that it has failed?—That is all.

477. Sir *E. M. Buller.*] I think you told us on

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on Monday the difference between the quantity of a bushel of barley when dry and when steeped, would you be kind enough to repeat that?—It depends very much upon the way in which it is manufactured. Some of the large brewers profess to get no increase.

478. That is to say, no increase upon barley as malt, but I am talking of barley before it is put into the vat to steep as compared with it when steeped, and before it is dry?—For the increase in the cistern 22½ per cent. is what we assume.

479. Then I am not very far wrong when I say that 100 bushels of barley will, when steeped, measure 122?—It would be very near that.

480. What will 100 lbs. of barley weigh when steeped?—I do not know what it will weigh when steeped. We did not calculate that.

481. Could you give us the difference between the pound's weight when steeped, and the pound's weight it would produce when dried?—The loss in malting is estimated at 8 per cent. in substance, or 20 per cent. in weight.

482. Are you talking of barley when wet, and do you mean that it would only lose 8 per cent. when dried?—Before it is steeped. It would lose 12 per cent. in addition, from loss of moisture.

483. Mr. *Read.*] Dry barley?—Dry barley will lose 8 per cent. of substance in the malting.

484. Sir *E. M. Buller.*] Do you mean to say that 100 lbs. of barley would only turn out 92 lbs. of malt?—It will only give 80 lbs. of dried malt.

485. Do you know the difference between bigg when dry and steeped, and when it is turned into malt?—I do not think it would vary.

486. It does, materially; but you are not aware of that fact?—No.

487. Colonel *Duncombe.*] Is bigg ever bought by the maltsters?—In Scotland and Ireland it is.

488. Not in England?—Not in England.

489. With regard to the expense of collecting the malt duty, did you say that it was 3 per cent.?—Yes.

490. Is that an estimate?—It is an estimate.

491. Because the excisemen are engaged in other duties, which you have enumerated?—Yes.

492. Therefore 3 per cent. is not really the exact figure?—£. 3. 11*s.* is the actual cost of collecting the whole of the Inland Revenue, and they are engaged in other duties; but collecting the malt duty costs about 3 per cent.

493. Shall you be able, before our labours terminate, to give us accurately what the cost of collection of the malt duty is?—I do not think I can give it nearer than that; I can give you the particulars by which we arrive at that.

494. Major *Parker.*] In reply to a question by Mr. Read, you mentioned that a portion of the duty of excisemen at breweries was to see that improper ingredients were not used?—Yes.

495. What are the ingredients that they are permitted to use besides malt?—Nothing but malt, hops, and sugar.

496. Sir *E. M. Buller.*] Water?—Water, of course.

497. Mr. *Hardcastle.*] Isinglass?—That is in fining; we do not consider it to be used in brewing.

498. Major *Parker.*] May any colouring be used?—Malt is dried in a particular way for the purpose of giving colour.

499. Any other ingredient found in the brewery would be considered improper and irregular?—Yes.

500. What power have you to take proceedings?—We have power to seize anything on the premises.

501. Whatever it may be, with the exception of the three articles which you have enumerated?—Yes.

502. Mr. *Surtees.*] Can you tell the Committee what articles are used which should not be?—Coculus indicus, in small quantities, and grains of paradise.

503. Any others?—There are a few in very small quantities (I do not remember them now), that have been detected in breweries.

504. Salt?—Salt is not considered an adulteration.

505. Tobacco?—Tobacco would be, but it has been found in very few instances.

506. Quassia?—Quassia would not now be prohibited since the repeal of the hop duty.

507. I do not know whether I quite understood what you said with regard to the loss of weight in malting barley, or whether you drew any distinction between the loss of weight and the loss of substance; I have before me a paper showing that the loss of weight is actually 20 per cent.; if you will allow me, I will read my statement, and you can correct me if it is incorrect: "Of that per-centage, 2 is due to soluble matter carried off by the steep water"?—I have that at 1½.

508. "2 to carbonic acid formed and given off during germination"?—3 I have for that.

509. "4 to the rootletts"?—3, I have.

510. "And 12 to the moisture ordinarily found in barley, but of which malt is deprived by the process of drying"?—That is correct.

511. "The actual loss of substance, therefore, is about 8 per cent"?—Yes.

512. But the loss of weight is 20 per cent.?—Yes.

513. Can you state to what extent the bulk of malt generally exceeds that of barley?—It entirely depends upon the method of malting; it varies from 0 up to 10 per cent., or more.

514. May the average be taken at about 5 per cent.?—I think about 5 or 6 per cent.

515. Mr. *Ayrton.*] Have you had your attention directed to the difference between the amount of beer upon which the beer duty was paid as compared with the amount made in this country in former times?—No, I have not.

516. Have you any returns to show how much beer was made in this country which was not subject to the beer duty when it was levied?—There are no means of arriving at that, except by estimating it from the quantity of malt made.

517. When the beer duty was collected, was it not collected upon the assumption, or checked upon the assumption, that two bushels of malt would make a barrel of beer of the lowest quality?—Not at that time.

518. Are you sure?—There was no check of that kind at that time.

519. Was not the lowest standard of duty upon the basis that it would contain the strength of two bushels of malt?—Not then.

520. *Chairman.*] Would it be possible to get the amount of beer brewed each year, at that time?—Yes, I think it would; they are getting out the return from 1826, which was asked for, and I dare say that it can be carried further back.

521. Could you also give us the number of convictions for using improper drugs in brewing for

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for the last 10 years, and the number of convictions of publicans brewing their own beer?—We call them all brewers; I do not think we can distinguish them. (*The Witness handed in a return,* vide *Appendix.*)

522. Mr. *Ayrton.*] Is there not a return distinguishing between brewers and licensed victuallers?—Yes; but in the number of convictions there would not be any difference made.

523. Will you be able to make out a statement showing the estimated quantity of malt used for brewing beer, upon which no beer duty was paid for several years before the abolition of the beer duty?—I will try and get it.

524. I should like you to explain a little more clearly the whole extent of the interference of the officers of the Excise with the manufacture of malt; in the first place, do they in any way interfere with the accounts kept by the maltsters?—Not in any way.

525. Are there no permits issued for the removal of malt?—Not any, except when it is made duty free.

526. At present they do not keep any accounts open to your inspection of the quantity of barley they buy, and from whom, or the quantity of malt they sell, and to whom?—No.

527. You are only able to check it by the quantity of malt in the steep, or of barley in the couch?—Yes.

528. Is there any check at all upon the barley brought into the malt-house?—Not until it is put into steep.

529. How many times is it surveyed between the first operation and the concluding operation?—It depends upon the situation of the malt-houses—occasionally the officer visits the place twice a day, or three times a day.

530. Occasionally it is modified, I suppose, by the confidence he has?—Not generally that, but by the situation of the house.

531. Have you any regulations affecting the actual construction of the plant with a view of more accurate survey?—The cistern must be made square, the ends and sides at right angles, and be not more than 40 inches in depth.

532. Do you prescribe the fittings of the malt-house in any way besides?—No, not for ordinary malt.

533. You do not consider that there is any interference with the operation that in any way affects the revenue, or makes the operation more expensive to the maltsters?—In a very trifling degree.

534. In what degree and how?—With regard to the number of times he can steep in the week; there must be four days' interval between each steeping.

535. Between the recommencement of the practice of malting and the operation being concluded?—Between the one steeping and the next there must be an interval of four days.

536. Upon what assumption is that interval based?—It is partially the maltster's convenience; as a general rule he would not wish to steep more frequently.

537. Is it based on a conclusion arrived at by repeated experiments, that a man could not malt honestly quicker than once every four days?—It enables us to check the difference between the vegetation, much better than if he were allowed shorter intervals.

538. What I want to ask you is this, is the four days based upon the conclusion arrived at by repeated tests or experiments, that if a man is doing his work in an honest and fair way, he could not do it quicker?—I believe that that is the general opinion.

539. Then the object of the four days is to prevent his introducing intermediately another steep, I suppose, and so cheating the excise?—Yes, I suppose so.

540. When you say that that is to some extent an expense to him, would that be from the fact, that under certain circumstances, certain conditions of temperature, and so forth, he could do it a little quicker than four days?—He would require more servants and larger kiln room.

541. Mr. *Hardcastle.*] And a larger floor too?—Yes.

542. Mr. *Ayrton.*] You mean that the floor would be larger in proportion to the vat for steeping?—Yes.

543. Is there any other cause of inconvenience to him, which would enhance the cost of manufacturing malt, do you know?—I think that is the principal restriction that would affect the cost in any way.

544. Do you know accurately how the calculation was made which gave the foreign maltsters a disadvantage of 3 *s.* a quarter?—One shilling was taken for the price of the duty on the grain; I forget the exact particulars.

545. Can you furnish the Committee with an exact statement how the 2 *s.* was computed?—I think I can.

546. It must have been, of course, an exact computation upon a certain basis; the basis being either a fact or an assumption?—Yes, it was so; it was liberally dealt with in favour of the British maltster.

547. Do you mean that there was a margin allowed as a sort of quietus to the British maltster?—Yes, a little margin.

548. However, as an allowance for the economy of manufacture, 2 *s.* is only the maximum, because one shilling goes for the duty on grain?—Yes; the other 2 *s.* for the cost of manufacture.

549. Therefore the additional expense, with this quietus, of manufacturing a quarter of malt under the excise system would be 2 *s.* a quarter?—Yes, I think that that would be the outside.

550. Have you had any memorials addressed to you from persons engaged in distilling as to the facilities that might be afforded of utilizing the first process of distilling, using that process equally for brewing or distilling?—Yes, I think that there has been one memorial on that subject.

551. Can you furnish the Committee with that memorial?—I will.

552. Do you know whether that subject was seriously investigated by the Commissioners of Excise, and whether there was any official report upon it?—I know that there was a report on the subject.

553. Will you furnish the Committee with the report on that subject?—Yes.

554. When the malt is thus finished, is it surveyed for delivery out again at the last moment, or is it not surveyed at all?—There is no notice taken of ordinary malt. If it is malt made by a maltster for distillery use, then it is locked up as soon as it is made, till it is delivered out for use, and used in the presence of the officer.

555. If it is not for that purpose, then there is no check upon the delivery out of malt by the maltster?—Not any.

556. When the malt is received by the brewer under

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under the present system, is there any survey on the receipt of the malt by him?—Not any.

557. Then the survey at present upon the brewer is of a very nominal character?—There is a visit to this extent, to look over the malt and see that it is not mixed with unmalted grain.

558. The survey then is merely for the purpose of insuring his using nothing but excisable commodities—sugar or malt?—Sugar or malt; he must not use treacle.

559. The object of the survey is to compel him to use exciseable commodities in the manufacture of his beer, and not to allow him to use unexcisable articles?—That is the purpose.

560. To attain that purpose, what is done by the officer in a large brewery; do you keep a man constantly in possession to watch?—No; he calls in only occasionally.

561. Are his visits regulated by the period at which the vats are charged in the brewery?—He will visit more frequently, the more frequently the brewer is at work.

562. That is to say, the oftener he renews his operation of brewing?—Yes.

563. But has the brewer to keep any books open to your inspection?—He has to enter in a book the quantity of malt or sugar he intends to brew, and the time of brewing it.

564. Does he enter the place whence it came and the venders of the malt?—No.

565. Are there any attempts made to check his weights or measures?—We endeavour to check the quantity he enters by gauging the grain after the malt has been used.

566. And before it is delivered from the brewery?—Before it is delivered out of the mash tun.

567. Are his materials surveyed for the purpose of making those gauges accurate?—The mash tun itself is gauged and tabulated.

568. And I suppose that there are penalties under certain circumstances?—There are penalties, if he exceeds a certain per centage.

569. The survey is upon some estimated relation of the quantity shown in the tun to the quantity of malt?—To the quantity entered in the paper.

570. Is there an estimated ratio between what it would measure in the second operation, and what the malt would measure when it comes in?—Very much would depend upon the quality of the malt; but in no case do we consider that it should exceed 20 per cent.

571. Then do you allow considerable latitude to the brewer?—Yes; we are obliged to do it.

572. Do you think that any advantage is taken of it?—Not by the considerable brewers.

573. Have you any reason to think that there is much admixture of unentered commodities in the process of brewing?—Not much on the whole. I think that the quantity of malt entered as brewed by the brewers compared with the quantity made, will show that.

574. Is there any survey made now on the reception of hops?—Not any.

575. You rely now upon the return that the brewer himself makes for that?—We do not take any notice of hops now.

576. You have to get the 3 *d.* a barrel, have you not?—That is on the quantity of malt he enters.

577. You charge him without any reference to the quantity of hops he uses?—Yes; without any reference to the quantity of hops he uses.

578. Do the brewers keep any account subject to inspection of the quantity of beer they brew?—They keep an account in this paper, which is left for the purpose, and they make a declaration at the end of the year that that contains a full account, but that is not an account of the beer, but of the malt.

579. You assume that that is used at a certain ratio per barrel?—We assume that two bushels will make a barrel.

580. But they give in no return at all of what beer they do in fact brew?—Not any.

581. Nor do you make any survey of any of the apparatus which determines the quantity brewed?—We do not.

582. Mr. *Hardcastle.*] With reference to the last questions which were asked by the honourable Member for the Tower Hamlets, the practical result is, is it not, that this new method of raising the hop duty by means of the brewer's license, presses more upon those brewers who do not brew bitter beer than upon those who do?—Yes.

583. That is to say, in fact, the article which is most consumed by the rich pays less duty?—I do not know whether the bitter beer is more used by the rich.

584. Mr. *Ayrton.*] Why is it that it presses more upon those who do not brew bitter beer?—It is an estimate of the quantity of hops; and if a brewer uses 4 lbs. of hops instead of only 2 lbs., he gets the advantage, compared with the former hop duty.

585. That is always assuming that he did make bitter beer with hops?—Yes.

586. Sir *E. M. Buller.*] I think you stated that the visits of the exciseman were more frequent when he happened to be near; do you mean that a maltster is subject to more and closer supervision if he happened to live near an exciseman?—That is so.

587. *Chairman.*] With regard to the convictions that we were speaking of the other day, have they been more frequently away from the place where the exciseman lived, or have they been where the exciseman lived?—There appears to be very little difference in that; I could give you an account showing it; 126 were on maltsters under daily survey, 36 were surveyed four times a week, and 62 five times a fortnight.

588. Do not you consider that it would be the duty of an exciseman to visit the out stations as often as he did those close at home?—He could not do it without a very great increase of the staff.

589. Then that shows, I suppose, that the men that live away from the station are a better description than the men that live near it?—They are generally smaller houses away from home.

590. And therefore less likely to do anything that is wrong?—Perhaps they might be.

591. You told us before that the shortening of the credit had nothing to do with the small malt houses being done away; still the small malthouses do exist, and those are the ones which are not visited so frequently by the excise?—It is regulated by the locality; it would not do at all to keep an officer for the purpose of visiting a single malthouse only; we send an officer from the nearest town or village.

592. I suppose the order is not that they should visit these less than those near at hand?—Yes, we are obliged to lay down an order of that kind, or they could not do the work.

593. Mr. *Dent.*]

593. Mr. *Dent.*] I suppose the truth is, that you put an officer to reside where there is most business doing?—Yes.

594. And, therefore, where there is much malting you put an officer to reside?—Yes.

595. And it would not be worth while for the Revenue to put an officer near every malting-house?—No.

596. Mr. *Goschen.*] It has nothing to do with your estimate of the comparative morality of small maltsters or large?—Certainly not.

597. Sir *E. M. Buller.*] You say that you do not allow them now to wet barley but with an interval of four days?—Yes.

598. And you say that you could not allow shorter intervals without their increasing their other business; supposing that you allowed a man to malt at shorter intervals, a smaller cistern would answer the purpose, would it not?—I do not think that they would gain much in that respect.

599. There is a certain balance between the cistern and the other accommodation they have, and if the cistern is large the accommodation must be large in proportion; but by confining them to the four days you do practically confine them to a larger cistern?—I do not think they would alter if they had the opportunity, for the men must find time to take in barley, and give out malt, and to do the other work.

600. There might be good reason for not altering, but if a man was going to construct a malt-house, if he were allowed to wet more frequently, he would put up a smaller cistern?—A maltster himself would be better able to answer that question; but I think not.

601. Mr. *Hardcastle.*] Is the expense of a cistern small?—Yes.

602. Sir *E. M. Buller.*] You say that you examine the grains in order to detect adulteration?—Yes.

603. Would that examination of the grains enable you to say whether unmalted barley has been used?—In some instances it does, at least it leads us to examine the premises very closely.

604. With regard to the license, you say that the hop duty is commuted to 3 *d.* a barrel, and that 3 *d.* a barrel is calculated upon two bushels of malt?—Yes.

605. In one case you seemed to say that it was charged by license, and that would be rather contrary to your statement that it was charged at 3 *d.* a barrel?—The license rate is computed at 3 *d.* a barrel for commutation on hops, and the former license added to it.

606. Then in point of fact the duty is raised by a license and not by an account?—Not by any other account than the license.

607. Then is that license regulated by the malt brewed in the previous year?—Yes, entirely by the quantity brewed in the previous year.

608. Mr. *Ayrton.*] Is not it the case that there is a clause in the Act for adjusting the account at the end of the year, and making returns?—There is.

609. So that it is on the current year if that be so?—If he has brewed a less quantity in the year just ended than in the former year, he receives a repayment.

610. He actually pays upon the year on which it is granted?—At the end of the year he does.

611. Sir *E. M. Buller.*] At the end of the year, if he has paid too much, it is returned to him; if too little, he pays that extra sum?—Yes.

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612. Mr. *Ayrton.*] Will you, if you please, in looking to the question of brewing, under the beer duty, ascertain for the three years before, and the three years after the repeal of the beer duty, the number of persons licensed to brew, and give us a return of the number of licenses granted for brewing?—I will do so.

613. Could you also search your records to see if, shortly before (say a year or two before) the repeal of the beer duty, there were any reports obtained by the excise, either by investigation, or otherwise, as to the amount of malt used for brewing upon which no beer duty was paid?—Yes.

614. And perhaps you would enquire, in further explanation of that, as to the extent of prosecutions and convictions for the evasion of the beer duty for two or three years before the repeal, and as to anything that will throw light upon the operation of the Act in that respect?—Yes.

615. Mr. *Goschen.*] With regard to an answer given by you just now, with regard to the prohibition to use any unexciseable articles in brewing, is that so distinctly, that if a new substitute for barley were discovered, the brewer could not use that?—He could not use that unless he malted it and paid duty on it.

616. There is distinct legislation as to sugar; but if there were other articles that he could brew his beer with, he would be prohibited under Act of Parliament?—Yes.

617. Mr. *Ayrton.*] He would have to bring it under the notice of the excise, and get an alteration of the law if it were really found practicable, so that the new commodity should be charged with an equivalent duty?—Yes.

618. Mr. *Goschen.*] Then the law is, at present, not only to put a tax upon malt, but upon any substitute that could be found for malt?—Yes; to equalise the malt duty.

619. I think, in your evidence last time, you or Mr. Stephenson mentioned that the license duty pressed more heavily upon the small brewer than upon the larger brewer; is that so?—It is only to a very trifling degree, if it is so; only a fraction of a farthing a barrel.

620. It is a tax that weighs upon the brewer according to the beer he brews and sells, and therefore is alike to the small brewer and large brewer?—Yes.

621. Mr. *Surtees.*] Is it the case that maltsters are required "to make entry in writing of every building, place, cistern, couch-frame, kiln, or other vessel or utensil to be used for making or keeping malt, or for keeping corn or grain to be made into malt, under a penalty of 100 *l.*, and forfeiture of all malt found therein"?—Yes, that is the law.

622. And is it the case that every entered building, place, and utensil is to be distinguished by a particular letter or number, which is to be painted in a large and distinct character, under a penalty of 100 *l.*?—I do not remember the penalty now; but that is the law, that it must be so distinguished.

623. Is it necessary for a maltster to take out a license, for which he has to pay from 7 *s.* 10½ *d.* to 4 *l.* 14 *s.* 6 *d.*, according to the quantity of malt made?—It is.

624. And must he give 24 hours' notice in writing of his intention to wet grain to be made into malt, and that he may not steep except between the hours of 7 a.m. and 5 p.m., and that

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the grain must be covered with water before the expiration of three hours from the hour in the notice, under a penalty of 100 *l.*?—That is the law.

625. In fact, there are various conditions imposing this penalty of 100 *l.* in case they are transgressed?—Yes.

626. *Chairman.*] Are all those penalties imposed under one Act of Parliament?—Principally under one Act; there are one or two Acts amending the former one.

627. Mr. *Surtees.*] Grain of separate steepings must not be mixed while in operation on the floor under a penalty of 200 *l.*?—It must not.

628. And must be kept in operation on the floor for 168 hours after being emptied from the cistern; is that the case?—Yes, it is the case.

629. And it must not be trodden, forced together, or compressed in the couch-frame, as you call it, under a penalty of 100 *l.*?—That is so.

630. Can you tell the Committee how many barrels of beer per annum pay a duty of 3 *d.* per barrel?—I have not that here.

631. Mr. *Read.*] This four days' interval between the steep is really for the convenience of the Excise and not for that of the maltster?—It certainly is more for the convenience of the excise.

632. In all sorts of weather, and for all sorts of grain, the maltster has to go through almost exactly the same process?—He has; but we have shortened the periods of late years, so that there is no difficulty in his working in warm weather.

633. But they are almost exactly the same as they were 50 or 60 years ago, are they not?—There have been many shortenings: the time of the water being kept in the steep is shortened, and he only keeps the barley in the couch 20 hours now instead of 30.

634. You do not allow him to take advantage of his own judgment or experience in the matter?—To a certain extent he can, in conformity with the law.

635. How do you estimate the commuted hop duty when sugar is employed?—In the same way exactly; 26¼ lbs. of sugar are equal to a bushel of malt.

636. The old beer paid an *ad valorem* duty, or according to the strength of the beer made? There were two rates; one rate was above a certain strength, however strong it was, and the next upon small beer.

637. That duty was upon the strength of the beer?—Yes; if it was sold above a certain price, and it was known that it was so, the weak beer was liable to the higher duty.

638. Lord *Eustace Cecil.*] Do you know whether the consumption of malt has fallen off in consequence of the enormous consumption of sugar?—It has fallen off; but although the quantity of sugar has increased, that does not make an equivalent.

639. Beer can be brewed without the use of malt?—It can be.

640. You have no reason to think that it is largely?—I think that, in any case, brewers would prefer to use malt to sugar, at all times.

641. Has the duty fallen off at all in the last half year?—It has considerably.

642. Mr. *Ayrton.*] During the last four or five years, have there been any memorials from malsters complaining of excise regulations, and suggesting alterations to facilitate the conduct of their business?—I do not think there have been any but what have been complied with by making changes in the law where they were shown really to be desirable.

643. Can you look through the records to see whether there are any such memorials that have not been complied with during the last four or five years?—I will do so.

644. *Chairman.*] You have stated that the business of the maltster is now in very few hands?—Comparatively.

645. And that they are, generally speaking, men doing a very large business?—Yes.

646. Is it your opinion that if the restrictions, and the malt duty were taken off, there would be a large increase of the smaller class of maltsters?—There might for a short time; but I think that the larger maltsters would soon get them out of the market by the greater skill they exercise.

647. You think, in fact, that it would not even then pay them to malt in a smaller way, but that it would still be preferable to malt in larger quantities?—I think so, in the same way as it is preferable for brewers now.

648. Mr. *Ayrton.*] Do you think that it might result in the smaller brewers to a much greater extent malting their own barley if there were no duty on it?—I think not.

649. *Chairman.*] Is there any penalty upon the brewer making a false return of the quantity of beer that he makes?—Yes; that is, of the malt he uses.

650. Mr. *Peel.*] Mr. Stevenson stated that, as a rule, brewers do not like to use these sugars, but he also stated that the quantity of sugar used by them in 1867 was 26,000,000 lbs., while it was only 8,000,000 in 1847; how do you reconcile those statements?—The 26,000,000 lbs., though it seems so large a quantity, is small compared with the malt which it displaces. That increase is owing to the high price of malt.

651. Mr. *Dent.*] In speaking of the falling off of the malt duty in the last half year, are you making your comparison with the corresponding half year of last year?—Yes.

652. Can you tell us the difference in the price of barley between the last six months and the corresponding six months of last year?—I have not that here.

653. Mr. *Ayrton.*] Do you happen to know the reason why the consumption of sugar in 1859 and 1860 doubled the previous average consumption; what was the cause of the change in 1859-60?—I presume that it would be the high price of malt and the low price of sugar.

654. You observed that previously, for several years, it was an average of under 3,000,000 lbs., and since 1860 it has been an average of about 6,000,000 lbs.?—Yes; it is principally one house that uses large quantities.

655. It is from one house having taken to sugar largely?—Yes.

656. Mr. *Hunt.*] Is there any malting now in a small way by cottagers?—No.

657. There used to be, used there not?—We never took any account of that.

658. Do you know as a fact that in some parts of the country cottagers do malt their barley gleanings, for the purpose of making their own beer?—If they do it, they do it surreptitiously.

659. Of course, if they do it, they do it surreptitiously; but was there a practice in some part of the country of their doing so, the excise officer taking no notice?—If it extended to a peck only, he

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he would not interfere, perhaps, but I do not think it extends beyond that.

660. You are of opinion that there is a certain amount of malting going on in that way?—Yes.

661. Mr. *Goschen.*] The latest "decrease" in malt was attributable to the invention of the glucose sugar, was it not?—I do not think it was attributable so much to that. I think that if the malt went low the sugar would go out immediately.

662. *Chairman.*] You partly explained to us what glucose sugar was; you told us it was grape sugar; can you explain how it is made, and why it is so very good for brewing?—It is a patent process.

663. Mr. *Hunt.*] With regard to this large quantity of sugar which has been used for brewing, I see that the quantity which that represents in malt for the present year is 1,000,000 bushels?—Yes, a little over.

664. Last year the number of bushels of malt charged with duty was a little over 50,000,000?—Yes.

665. So that, though it is some little quantity in itself, it bears no proportion to the malt?—No proportion of any consequence.

666. Mr. *Surtees.*] Is there any cottage brewing going on now?—I think very little.

667. *Chairman.*] I suppose that that does not come under your notice, and you therefore are not able to give us a definite answer upon that point?—No, only from mere observation.

668. Mr. *Hardcastle.*] You were asked something as to the interference of the Excise with the method of the manufacture; are you aware that there is considerable difference between the method pursued at Newark, and in that part of the county, and that pursued in other parts of England as to the proportion between the size of the kiln and the size of the floor?—I was not aware that that made a difference.

Mr. Charles Randall, called in; and Examined.

Mr. C. Randall.

669. *Chairman.*] You live in Worcestershire, do you not?—I do.

670. In what part of Worcestershire?—Within two miles of Evesham; 13 miles from Worcester.

671. Do you farm land of your own?—No, I do not; I rent land.

672. Will you tell us what quantity of land you rent?—Seven hundred and fifty acres.

673. Have you any other occupation besides?—Yes, my principle occupation is that of land agent.

674. Does that land agency extend beyond the county of Worcester?—Yes; into Staffordshire for instance.

675. And over a large extent of country?—Yes.

676. Is that part of Worcestershire in which you live a barley country?—It is a mixed cultivation; barley is grown to a considerable extent, but not so much as it would be probably if there were a better market for our inferior barley.

677. Is it what you would call a good barley district?—Part of it is; it is very variable.

678. And is your soil a good barley soil?—Part of it.

679. Do you farm it on the four course system?—Part of it; the light land I do.

680. How many acres of light land are there upon your farm?—About 160.

681. How many acres of barley do you generally grow in the year?—Very few now; this year none on the barley land.

682. Do you grow the best quality of barley when you do grow it?—Yes.

683. Do you grow any inferior barley as a rule?—That entirely depends upon the season; the inferior barley is caused by a wet harvest or rain to some extent.

684. What effect do you think that the malt tax has upon the best barley?—I do not think that it affects the price of it.

685. What effect do you think that the malt tax has upon the inferior barley?—I think it lowers the price of it very much.

686. Do you find a difficulty in selling your inferior barley?—For malting purposes it is not worth paying the duty upon, in fact.

687. What accounts for the difficulty in the sale of the inferior barley?—Precisely that; that it is not worth paying the duty upon.

688. Then for what purposes do you use the inferior barley?—It is grown for cattle.

689. Do you think that the malt tax prevents maltsters buying any but the best class of barley?—I do.

690. If that is the case, how much do you think it decreases the price of inferior barley?—I cannot say to what extent; it prevents its being malted.

691. We will say, for instance, that this year the best class of barley has fetched 50 *s.*; I want to know, supposing the duty was off barley, what would be the relative price of inferior barley to the best class of barley, presuming that it would then be malted?—I think you should take an intermediate quality of barley; there would be one quality of barley that would in no case be saleable for malting purposes; but between that and the best there would be a barley slightly stained, so much so as not to be saleable to the high-class brewers, but which still would be saleable for malting purposes to the other brewers, and would be convertible into malt for our consumption and the consumption of our labourers, which is somewhat considerable in extent; if we had a market for inferior barley, stained, or damaged by weather, so that we could convert that barley into malting purposes, either by malting it ourselves or selling it, that would induce me to grow more barley than I do now.

692. What I want to know is this: we are supposing the best class of barley to be worth 50 *s.*; what was the value of that second class of barley which you could not sell for malting purposes last year?—With us the best barley last year was 56 *s.*; the barley most damaged was sold at 24 *s.*; the intermediate would be worth about 40 *s.*

693. Supposing that the duty was off malt, and that the second-class of barley was malted, what would be the difference between the best and the second-class barley?—I should say 1 *s.* a bushel; of course, that is a mere estimate.

694. Mr. *Hunt.*] That is the difference between class 1 and class 2?—Yes, it is the difference between class 1 and class 2; class 3 not being available for malting purposes.

695. *Chairman*] How do you describe the three different classes of barley?—I will begin with the fine barley; that is, the best malting barley,

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barley, such barley as Burton brewers would use; they are our best customers for that barley; they will not buy the second quality of barley, which (mainly, perhaps, from having been wetted during the harvest) has lost its colour, and become stained; it is rarely sold for malting purposes with us.

696. What is the third class; how is it designated?—Grinding barley.

697. Mr. *Ayrton.*] What is No. 2 called?—There is no No. 2 now; we should have a No. 2 if the malt tax were not in the field. There are still two classes of malting barley; but the first and second class of malting barley depend upon the soil as well as upon the harvest.

698. *Chairman.*] Will the second class barley make porter?—I do not know.

699. Sir *E. M. Buller.*] Practically, is it not the fact that in the prices which are given of grain in the market you have only two qualities stated, malting barley and grinding barley?—I think so.

700. What is the average difference between one and the other?—Except on the average of years, it would be difficult, I think, to give any definite answer to that, because it depends so much on the extent to which the grinding barley has been damaged by weather; last year it was damaged to a great extent.

701. Taking the average as it would appear in the returns from the markets, you have malting barley quoted at a certain average price, and grinding barley at a certain average price; what is the difference between one and the other in those markets which you are best acquainted with, on the average of years, so far as your experience goes?—I should say that, on the average of years, the difference is something like 1 *s.* 6 *d.* a bushel.

702. Mr. *Goschen.*] Is that between the first class and the lowest?—Between the barley we can sell for malting and that which we cannot sell for malting.

703. I understand that your classification is into three?—Yes.

704. How would that correspond with the two classes?—My classification into three was supposing that there were no malt tax.

705. Sir *E. M. Buller.*] What would be your expectation of the effect of the repeal of the malt tax with regard to the prices of those two qualities of barley; 1 *s.* 6 *d.* you say is the average difference between one and the other; would it be greater or less if the malt tax were repealed?—The difference would be less; there would be a larger quantity of barley sold for malt than now. I mean that barley slightly stained would be sold, which now would not be considered worth paying duty upon.

706. You have not told me definitely what you think would be the change; how much nearer would the grinding barley approach the malting barley than 1 *s.* 6 *d.*, which you say is the difference now?—I have said that I think that the difference between the best malting quality and the second quality of barley, supposing there were no malt tax, would be about 1 *s.* a bushel.

707. Lord *Eustace Cecil.*] There was 16 *s.* difference last year between the second class barley and the first, was there not?—More.

708. Sir *E. M. Buller.*] That barley which you say comes near the barley which can be used for malting, you call the stained barley?—Yes.

709. That barley if malted will grow perfectly well, will it not?—It would not all grow; some small per-centage would not.

710. The difference in making beer from the stained barley instead of making it from the best is more a difference in colour and brightness than anything else, is it not?—I think so.

711. You could make nearly as good beer from what you call stained barley as you can from the best?—I think so.

712. And it would be just as useful for your purposes as a farmer in giving it to your labourers as if it were made from the best?—Yes.

713. And that would be a very great advantage?—Yes.

714. With regard to the inferior barley when malted, a very large proportion of that does not germinate at all?—No, it has germinated already, and does not germinate again.

715. Mr. *Goschen.*] Is what is called grinding barley ever used for malting at all?—I should think not at the present rate of duty; that is to say, barley which we should consider unfit for malting purposes would not pay for the duty.

716. I understand that there is a great part of that which would in no case be used for malting purposes?—It depends upon what has grown in the field. There is some that would be slightly grown that, if there were no duty, would be used for malt, but that which had grown further would under no circumstances be worth malting.

717. In what way does the barley being stained damage the beer of those who use it?—It affects the colour of their beer, I take it.

718. But they do not want more barley of an inferior kind than of a superior kind, do they?—Yes; if they used stained barley, and a portion of that barley had grown before, not being malt, in fact, then they would require a greater number of bushels to produce the same amount of beer of the same quality.

719. It is in that respect, the duty being the same upon the stained barley as upon the other barley, that it presses more heavily upon them?—Yes.

720. The malting power of the stained barley will not go so far as that of the best barley?—No; so far as a portion of that stained barley has grown already, the malting power is at an end.

721. Then there are two defects in the stained barley; in the first place, it does not go so far, and, in the next place, it gives a worse colour?—Yes.

722. I understand that now there are two classes of barley that are sold for malting purposes, some to the best brewers, and other barley, I understood you to say, to other brewers not quite so particular?—It is so.

723. What is the difference between those two barleys, sold to those different classes of brewers?—It varies very much;—I should put the average at 1 *s.* a bushel; I am speaking of the average of years; it would be much more this year.

724. In the first place you have the best barley, which is used by the best brewers?—Yes.

725. Then you have stained barley, but not very seriously stained, which is used by other brewers?—Yes; and when the best barley is at a very high price, there is more of that second barley used.

726. Then, in the third place, you have barley stained so much that they will not take it at all?—Yes.

727. You think that they would take it if the malt

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malt duty were removed?—Not much of the third class even then.

728. Then practically at present there is a market for the stained barley, but not such a good market as there is for the best?—And when the best is at a low or moderate price, then of course the market for the second quality is still more depreciated, that is to say they will not buy the second quality if they can get the best at any thing like a moderate price.

729. Then the effect of the barley for malting does not depend upon the quality of the barley itself, but upon its condition?—Upon both.

730. Will you state to the Committee the effect of the quality of the barley itself?—You assume, I suppose, that we are taking two qualities of barley, the one a fine quality, and the other a coarse quality, and that both are got without rain. In that case there is still much the same difference between the price of the two. The best brewers will not buy what you call the rough barley, whether the dark colour has been produced by the soil or by the rain. If the colour is bad, whether that bad colour has been produced from rain or from other circumstances (the quality of the land on which it is grown for instance) there is still about that difference in the value, somewhere about 1 *s.* a bushel.

731. Your evidence so far is confined to the condition of the barley where there has been rain; will you state to the Committee the effect of the barley when grown upon good land or inferior land?—I have stated that there is that difference whether the bad colour is from rain or from the soil on which the barley has been grown.

732. Lord *Eustace Cecil.*] Can you use what is called the grinding barley for feeding cattle?—Yes; feeding pigs and cattle.

733. Colonel *Duncombe.*] The barley being stained, may be caused by the nature of the soil on which it is grown, as well as by the weather?—Yes; I would not say it was stained barley, but a dark coloured barley.

734. Is there much land in Worcestershire where they cannot grow the best barley?—In certain seasons on our clay land both the colour and the quality of the barley are inferior.

735. As to the darker coloured barley, do the best maltsters use that?—So far as I know, they do not; at least they do not purchase it in our neighbourhood. That is malted and sold to the maltsters of our own neighbourhood.

736. Mr. *Ayrton.*] Have you any idea of the number of persons who take the inferior class of barley?—I could not say.

737. How is this classification of the first and second quality arrived at; is it by the eye?—By sample.

738. What do you mean when you speak of stained barley?—When we speak of stained barley we mean, generally, stained from a wet harvest.

739. Does that produce only a deterioration of the colour of the beer, or does it deteriorate the quality of the malt for making it?—The same cause that would produce the one would produce the other.

740. It is an indication of its want of the qualities for making good beer?—It is of no use for that.

741. When it is very badly stained, it goes into the classification of grinding barley?—Yes.

742. Have you any knowledge of the percentage of deterioration between the first and second quality of barley in making beer, what it is estimated to be?—I only judge from the price it fetches.

743. That would be a difference of 1 *s.* a bushel, you have said?—Yes.

744. You think that this lower quality would be used up to a much greater extent in the neighbourhood if it were not weighted with the malt tax; I am speaking now of that which goes into the third class?—I mean that taking that barley which is so much injured by being stained from some cause or other, by being discoloured by the natural character of the soil, or the season, or a wet harvest, more of that barley would be used for malting than there is now.

745. It would be put up into the second quality of malting barley?—You might then more properly say that we had a third quality; supposing we could not sell that barley for other people to malt, we should malt it ourselves for the consumption of our labourers; the consumption of labourers is very considerable. My malt tax is 50 *l.* a year.

746. The price of the inferior barley is diminished to make up the surcharge of the malt duty, because it does not go so far in making beer?—Nor is it of such good quality.

747. That would not affect the question, would it?—It would affect the question of sale.

748. It would not affect, would it, the price as regards the malt duty, unless it affected the quantity?—It affects the price of the barley, because you have a different class of customers for the fine barley from that you have for the second quality barley.

749. The price of the inferior barley is lowered for the purpose of indemnifying the purchaser for the extra amount of malt duty that he has to pay in consequence of the use of it?—The price of it is lowered because there are many people who will not have it for malting at all; that is to say, the price of that which is good enough for the country brewers, but not for the Burton brewers, is lowered because there is no competition, at least you have not the Burton men to compete with the country maltsters for the purchase of that barley.

750. I do not understand how the malt tax affects the selling price of barley, unless more barley is required to make a barrel of beer, and therefore more malt duty is required?—We should sell the inferior quality of barley for malting purposes more largely but for the malt tax.

751. You think that the price is diminished by there being less demand for it for purposes for which it would otherwise be used?—The price of the inferior barley is diminished, because, as I have said before, it is not used for malting purposes.

752. Mr. *Surtees.*] Is there less saccharine matter in the inferior barley than in the best barley?—Undoubtedly.

753. And is not that one of the principal requisites of the brewer?—Yes.

754. And in consequence of there being less saccharine matter in it, does not the malt duty press more heavily upon the inferior barley?—It presses upon it more heavily, whether or not it be from its being stained or discoloured; all those barleys are reduced in their saleable value by that.

755. Is barley, which is termed steely, good for malting purposes?—No, not so good; that is what we call thin barley.

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756. Mr. *Read.*] Do you consider Worcestershire to be an arable or a pastoral county?—An arable.

757. Could you give us any idea of the proportion of grass?—I could not; in my portion of the county it is very much more arable than pasture; the pasture is a very small proportion.

758. I see from the returns of last year that there is only one acre of barley in Worcestershire for every 24 acres?—I daresay that would be nearly the proportion in a good part of it; where we had farmed upon the four-course system two crops are wheat, instead of being merely one wheat and the other barley.

759. If there was no malt tax, would the barley grown be very much increased?—I think so, for this reason: we should be able, if we grow the best quality of barley, to make a good price of that; and if, by a wet season, that barley was injured, we could sell it for malt, or use it for our own consumption in the shape of malt, and in that way make more money than now.

760. Is it possible to produce a very large crop of the very best barley?—It is possible to grow six quarters to an acre, and the quality as good as you can grow.

761. But a very great crop; seven and a half quarters to the acre, say?—Seven and a half quarters would be more than it could stand.

762. This very large crop could only be produced by excessively high farming?—A very high condition.

763. You consider, therefore, that the malt tax is against very high farming?—In that way.

764. There are certain descriptions of land upon which you cannot by possibility grow first-class barley?—As a rule it is so; it very much depends upon seasons; on our stiff clay, which is not supposed to be barley land, we grow very good barley.

765. Mr. *Dent.*] You rather think that if the malt tax were repealed, the price of the second quality of barley would approach more nearly to the price of the high class of barley?—Yes.

766. Do you not think that the highest class of barley would probably be reduced in price by the abolition of the malt tax?—I do not think so.

767. Are you not aware that with regard to the second quality of barley, a great quantity can be brought from abroad to compete with it?—Yes.

768. And at the present time, in consequence of the incidence of the malt tax, the highest class of barley bears a very much higher value; it is not worth while importing the foreign barley at the price?—A considerable quantity of foreign barley is malted; french barley.

769. Not any very great quantity, is there?—There would be more, if there were no malt tax, in the same way as there would be more of our inferior barley, and for the same reason.

770. Would not that tend to lower the price of the highest quality of barley?—I think not. I think that the highest quality of barley will certainly maintain its price.

771. You think that the highest class of barley can only be grown under certain conditions?—Yes.

772. And that England is the only country that can produce it?—I do not say that; some of the french barley is as good as ours.

773. You do not think that the use of the foreign barley, and the second class English barley, under the repeal of the malt tax, would tend to lower the price of the first class?—I do not.

774. Mr. *More.*] If the malt tax were repealed, do you think that it would largely increase the arable land in England?—No.

775. Would it not have a tendency to turn waste lands into arable; would it not, then, be worth a landlord's while to plough up waste land?—It never occurred to me that it would have that effect; there is quite enough inducement now to convert waste land into arable.

776. Are some of your neighbours cider makers?—Yes.

777. Do you feel that you have a grievance in your long period of tax-paying in contrast with them?—I feel the grievance of the malt tax in this way: I pay 50*l.* a year; my direct tax in respect of the consumption of my labourers is about that; now we cannot convert barley into malt to use for our own purposes without the malt tax, but if it were repealed we should supply our men with malt, and the effect would be that we should keep them more at home, instead of their going to the public houses; in that way we should benefit.

778. Mr. *Peel.*] Is not the tendency of things to reduce the number of brewers to the great firms?—It does appear so.

779. And are not the great brewers your best customers?—For the best barley.

780. They are very particular in taking only unstained barley?—Yes.

781. And if the malt tax were repealed it would not affect the sale of barley to the large brewers?—I should think not; probably they would still be as particular as they are now.

782. Mr. *Hardcastle.*] I think you said that you paid 50 *l.* a year in malt duty?—Quite.

783. I will not ask you whether you farm under lease, but I will suppose that you farm from year to year?—I have two farms, one under lease, and the other not.

784. Supposing that farming from year to year you saved that 50 *l.* a year, would there not be a probability that your landlord would have the advantage if the malt tax were repealed; do not you think that he would be inclined to raise your rent?—I do not think so; I should be much surprised if he did.

785. Then he would let you have the farm 50 *l.* a year cheaper than you have it at present?—I should say that that would be the effect.

786. Mr. *Hunt.*] Do you brew yourself for your labourers?—Yes.

787. Do you ever use what you call the stained barley?—No, because I should have to pay more; I should use it if I could malt it myself.

788. Supposing that the malt duty were repealed, who do you think would buy this stained barley?—Country maltsters, or we should use it ourselves, instead of selling it.

789. You have described barley growing on good barley land, which had been damaged by weather?—But there is much inferior barley which has not been weather stained, but is inferior owing to the quality of land on which it is grown?—Yes.

790. Is it the case that barley grown on that kind of land has much less brewing power than the barley grown on the best barley land?—It does not make so much money, but I doubt very much whether the beer for ordinary purposes is any the worse for having been grown on that land.

791. I want to distinguish between barley which

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which is inferior by reason of its colour, and barley which is inferior by reason of its quality, independently of its colour; you would make such a distinction, would you not?—Yes, we consider it worse for selling purposes.

792. Never mind the "selling purposes;" I am talking of the natural quality of the barley; there is barley which is got in good weather, and of which the colour is as good as you can expect it to be on that kind of land, but yet which is in its nature inferior to barley grown on the best barley land; is not that so?—Yes.

793. Taking the same quantity of malt malted from that barley, you will not get the same strength of beer out of it?—Just so.

794. Then it has not the same brewing power in it?—Yes, that is so.

795. If that be so, how would taking the duty off malt bring up that kind of barley to the level of the best barley?—Because they pay alike.

796. But you would have to use a larger quantity of the second quality of barley to get the same strength out of it?—I am not clear about that for ordinary purposes; for sale you would.

797. Supposing you were going to brew yourself, there is some barley out of which you would get a much greater quantity of beer of a given strength than out of other barley?—Yes.

798. The difference between one and the other is inherent in the quality of the grain, is it not?—Yes.

799. You have told us that you farm 750 acres, and that not more than 150 acres is barley growing land, the rest being of a different nature?—Stiff clays. We can grow very good quality barley upon what we call stale furrow.

800. Can you grow as good on that as on the rest of your farm?—On the average of seasons we could not.

801. Is it not the case throughout your county generally, that you cannot grow the finest barley on the generality of the land?—Inasmuch as a large portion of the county is of that description, we could not.

802. Then the larger portion of Worcestershire is not well adapted to the growth of barley?—Not well adapted to the growth of the finest barley.

803. With reference to barley which is of good quality in itself, but which has been got in in bad weather, the colour affects the sale of it?—Yes, and the malting power may affect the sale of it also.

804. In that case it is purely accidental; the result of the weather at the time when the barley was ripening and was harvested?—The time when it was harvested.

805. Is barley stained by weather ill-suited for brewing beer or porter?—It is less valuable for the purpose, consequently very much less saleable; as I have said before, it is not worth paying the duty upon.

806. I think I have understood you to say that barley which is now 1 *s.* 6 *d.* lower in price than the best barley, would, if the duty were taken off, approach it within 1 *s.*?—I think so.

807. What is your ground for estimating that?—Because then it would be malted; the objection now to malting anything but the finer qualities of barley is having to pay the duty upon them.

808. Do you think that more beer would be drunk then?—Yes, I do.

809. Or that this which you call inferior barley would compete with the finer barley?—I believe that more beer would be drunk, and with less intoxication, among the labouring classes, certainly.

810. Mr. *Cave.*] When the duty was taken off malt, you think that more malt would be made of inferior barley than before?—Yes.

811. Supposing that the same quantity of malt was made altogether, it is clear that that would tend to reduce the price of the best qualities of barley?—It appears so; but the best qualities of barley, the finest qualities, are not grown to a sufficiently large extent to be likely to be reduced in price so as to affect large brewers requiring the quantities they do. I do not think that anything you do can reduce the price of the finest barley.

812. If the same quantity of malt were used, and more beer were made of inferior barley, it would be an absolute necessity, would it not, that the higher class of barley would be reduced?—I do not see that.

813. Surely if the same quantity of a thing were made of an inferior and a higher class of article as is now made of the higher class alone, that would tend to reduce the higher class in value?—I do not see, unless you could increase the quantity grown of the higher class barleys, in what way you could reduce the price of them.

814. If the same quantity of malt were made as before, and some of it were made of an inferior barley to that used before, would not the inferior barley used for malt push out of the market an equal quantity of superior barley now used?—I think not; there is a special class of barleys that are required for Burton beer, and for such as Burton beer.

815. I am talking of all malt; if a larger quantity of malt was made of inferior barley than is made now, and the quantity of the malt altogether was the same, the inferior must push out of the market an equal quantity of the fine, must it not?—If you limited the quantity to the same as is used now, it might be so.

816. I want to get at your opinion on the question, how much the increase would be of the malt if the duty were taken off; I do not mean as to the exact quantity, but whether you consider that there would be a large increase?—Undoubtedly.

817. I want to know in what way that would be?—Speaking of an agricultural community, of which I know more than a manufacturing one, the agricultural class would be supplied with beer all the year round as part of their wages, instead of being, as now, only supplied during hay-making and harvest; our men would have an allowance of malt which they would use in their own houses, and drink with their own families.

818. Would not that displace an equal quantity of beer now sold in public-houses?—It might displace some, and I should hope it would, certainly, but not to any large extent; our labourers now have not the means of spending much in public-houses, though some of them spend too much there; the consumption of beer in public-houses is nothing like what it would be with their own families if they had the malt allowed them in that way.

819. Do you know what sort of barley is sold for distilling?—What we call grinding barley is sold for distilling.

820. The common sort?—Stained barley; any sort is used for distilling.

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821. To the distiller it would not make much difference if the duty were off?—No.

822. You say that if more barley were grown (which it would be, in your opinion) in consequence of the duty being taken off, less wheat would be grown?—Yes, a less quantity, but a larger produce per acre would be grown by the wheat crops being grown further apart than they are now

823. *Chairman.*] Mr. Hunt has pressed you very hard to know whether there is not a great difference, and would not be a great difference, in the manufacture of beer from the first class barley and from the second class barley; what he meant to ask, as I understood him, was whether the first class barley would not produce a much stronger and better beer than the second class barley; now barley of the second class which may be stained may yet be a very good barley, and may produce a very good quality of beer; is not that so?—Yes.

824. I will put the question in this way—taking barley grown upon strong land, which would be a good average sample to your idea, but yet not a maltster's sample, would not that produce, in point of strength, as good a kind of beer as the best kind of barley would produce?—Yes.

825. Supposing you grow the finest quality of barley upon good light land, and that you grow barley upon strong clay land, and that that latter barley does not command in the market the same price, is it your opinion that the beer brewed from that barley would be inferior in strength to the beer brewed from the other barley?—It is a question of degree. On our clay land we sometimes grow barley which, though not of a very good colour, is as stout-bodied as that grown on the finest land, and the quality of beer would be as good from that as from the finest barley.

826. Mr. *Hardcastle.*] You are not a practical brewer, are you?—No, I am not a practical brewer.

827. Then, in fact, all your opinions on this subject are speculative?—Yes, very much so.

828. You do not know the difference in the amount of fermentable extract which would be produced by your best quality of barley and your second quality?—No.

829. Mr. *More.*] I suppose that if the malt tax is repealed, you look forward to being a practical brewer?—So far as our own consumption is concerned.

830. Sir *E. M. Buller.*] The reason why the inferior barleys are not malted is because the malt tax falls with peculiar severity upon your inferior barley?—It is so.

831. For instance, supposing malt made from the superior barley to be worth 60 *s.*, malt made from the inferior barley might be worth 45 *s.* very easily, might it not?—Yes.

832. The duty upon the 60 *s.* barley would be not more than 36 per cent., while upon the inferior barley the duty would be at least 50 per cent.?—Yes.

833. And that is the reason why it is never desirable to malt inferior barley?—It is so.

834. Supposing the tax to be taken off, in your opinion would it ever be desirable to malt inferior barley till you had exhausted the superior?—Yes; we should sell the superior barley, and malt inferior.

835. One of the great advantages you would contemplate would be being enabled to malt your own inferior barley at home, and to brew from that, though perhaps not so bright a beer or so good a beer as the best, yet a good and wholesome beer, which you could give to your labourers instead of wages?—Yes.

836. The question was put to you, whether in that case you would not expect your rents to be raised; practically, is not this the case, that when your produce increased in the market value your landlord would probably put on an increase of rent?—We should be very much surprised if the landlord did in the case supposed.

837. Do not you, as a surveyor, when you let a farm, ask what is the price of wheat, what is the price of barley, what is the price of cheese, and so on, and lay that on to the rent?—We know the average prices of the different produce.

838. And if the average is raised you put on a higher rent?—Yes.

839. But now with regard to the expenses of a farmer: supposing that a farmer, by economy and by good management, reduced his expenses (which you would do by brewing your own beer), then probably the landlord would not come upon him?—I think he would not; it is a point which landlords are not likely to take into consideration.

840. In the one case, where there is an increase of value in the market on the produce, there would be an increase of rent?—Yes.

841. But where you put yourself in a better position by economy and good management as a farmer, you do not get rents increased?—We do not get our rents increased by economy and good management.

842. All you gained by that economy would go into your own pocket, and not into the pocket of your landlord?—Yes.

843. On your Worcestershire farm you do not grow as large a quantity of the finer sort of barley as they grow in the eastern counties?—No.

844. The weather is against you, the soil is inferior, and you would have a greater proportion of stained barley than they would have there?—Yes.

845. Why should that be so?—Because on our stronger lands we get our crops down more.

846. And you have more rain than they have in the eastern counties?—Yes.

847. Is it not the case also that your harvest is usually later?—Rather later.

848. And owing to that, of course you are exposed to inferior weather?—Yes.

849. All that leads you to grow a larger proportion of coarse barley than of fine barley, and therefore you would anticipate a greater advantage to you from the repeal of the malt tax than an Essex or Sussex farmer might anticipate?—Yes; the risk of getting that dark coloured barley would be greater with us, I should say.

850. Mr. *Goschen.*] You think, I understand you, that you would save 50 *l.* a year by the repeal of the malt tax?—Certainly.

851. You do not think that that saving to you would be shared by the landlord on the one hand, or by the maltster on the other?—The malster would have no share of it; I should malt my own.

852. Would the general beer consumers of the country have any advantage?—It would lower the price of the malt.

853. Lord *Eustace Cecil.*] As to the barley in Worcestershire, do you grow more of what you call

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call first-class barley than they do in Essex, or the eastern counties, or the contrary?—Not so much as in Essex and the eastern counties.

854. *Chairman.*] With regard to the rotation of crops, do you think that the malt tax interferes with their proper rotation?—I do.

855. In what way?—In this way; that where we should grow barley we now grow wheat. Take the land farmed on the four-course system; that would be turnips, barley, seeds, and wheat; where now it is turnips, wheat, seeds, and wheat.

856. Do you grow oats sometimes instead?—No.

857. If you grow wheat instead of barley, which ought to come in its proper course, do you think that detrimental to the land; do you think that it takes more out of the land?—It takes more out of the land, because we have to farm more highly for the land to bear it; as we crop the land we manure it, and we farm more highly than we should do if we took barley in its rotation instead of wheat.

858. That would particularly apply to the light land?—Yes.

859. But with regard to the heavy land; supposing that there was no malt tax, you would sow one course with barley instead of wheat?—Yes, once in six years.

860. Therefore, in that proportion, there would be that extra quantity of barley grown throughout the country, as a rule?—I would not say fully to that extent, but nearly so. When I speak of the six-course system upon our clay, I do not know that we should always grow barley upon our fallow; the reason is the additional risk of the harvest. But that risk would be reduced, and we should have the barley once in six years with the clay, where we do not take it at all; and once in four years with the light land, where we do not take it at all.

861. Do not you think that this country is peculiarly adapted to the growth of barley?—A great part of it.

862. As far as you know, better than foreign countries?—I no not know that I can speak positively to that; but, judging from foreign barleys, I should say that England was more adapted to the growth of barley than foreign countries, except perhaps France.

863. Taking the present prices of wheat and the present prices of barley, would that change your opinion in any way with regard to the rotation that you have just now proposed, provided the malt tax was off?—No.

864. Supposing the prices to be as they are at this present moment, you still adhere to your opinion that you would grow barley on the four-course system on the light land, and on the six-course system on the heavy land?—Yes.

865. That is to say, you think that the repeal of the tax would enable you to grow barley in its proper course?—Yes.

866. As it is at present, you think that the tax is a serious drawback to what you would call the proper cultivation of the land?—Yes; we grow more wheat than we ought to do, partly on that account.

867. Mr. *Read.*] If you grow a good crop of the best barley, is that the best crop you can grow at the least cost?—If you include growing and harvesting after.

868. It is the least time upon the ground?—Yes.

869. And it takes as little out of the ground as others?—Yes.

870. Mr. *Dent.*] Surely your part of the world is much better adapted for the growth of wheat than barley?—On the clay land; and on that account I should take in six years two crops of wheat to one of barley.

871. The repeal would not affect you, therefore, would it?—I think it would. I should grow barley planted on the stale furrow once in six years, where I do not now on strong lands.

872. *Chairman.*] What is the stale furrow?—The preparation for barley on the clay land; it is planted with vetches in the autumn of the previous year; these vetches are eaten of the land by sheep, and the land is then fallowed and left till the following spring in the rough state of fallow, and all that is done to it in the spring is to scarify it to destroy surface weeds. That is the most certain preparation to succeed with the barley upon our strong land.

873. Mr. *Hardcastle.*] Did I rightly understand you to say, in answer to the honourable Member, that your best paying crop was a barley crop?—Mr. Read's question was whether a good crop of barley would not pay the most money.

874. And you answered that it would?—Yes.

875. The chance of getting a good crop of barley does not depend upon the malt tax?—There are two things against it; the first is as to the probability of getting it all down, and the second is the liability to wet; but a good barley crop would be the best paying crop.

876. In the matter of profit, you have every inducement therefore to grow the best barley that you can?—Of course, it is a problematical sort of crop to get.

877. It will not be less problematical if you repeal the malt tax?—Certainly not; but then if we failed in getting the best quality of barley, we should have a market for it, which we have not now.

878. Mr. *Hunt.*] This advantage of having once in six years a crop of barley upon your heavy land depends upon the assumption that if the malt tax were repealed the price of inferior barley would be assimilated to the price of superior barley?—Yes.

879. Mr. *Read.*] You do not mean to say that they would be the same?—No; I do not mean that they would be the same, but that the difference would be less.

880. Mr. *Cave.*] You stated that when the extent of land sown with wheat was reduced, the quantity of wheat would be the same, did you not?—I said that the produce per acre would be increased; the crops of wheat being further apart they would yield better; by crowding the land you may, by high cultivation, by forcing and manure, get as bulky a crop, perhaps.

881. You grow wheat too closely together?—We grow wheat too closely together now; there are some qualities of clay which we should never grow barley upon, but on several qualities of clay we should.

882. *Chairman.*] And it would be better for the land itself to have the crop of barley?—Yes.

883. Mr. *Hunt.*] What is your sixth course in Worcestershire?—Fallow, with vetches eaten off; barley; clover; wheat; beans manured; wheat.

884. You said that if the malt duty were repealed you would grow barley once in six years; but that is your present practice now, is it not?—The

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—The clay land now is all wheat; that is to say it is not barley; instead of barley succeeding barley, it is now wheat succeeding barley.

885. *Chairman.*] Could you give us the relative value of the two crops, the barley crop and the wheat crop, supposing the malt tax to be off, and supposing that you grow a fair crop of each?—That is to say, to what extent the growing of barley, instead of wheat after the wheat, would affect the wheat crop?

886. That is one point; but I want you to show, if you can, that the crop you grow of barley would be of more value to you growing barley once in six years than the wheat crop, if the tax were off the barley?—To show that, I must go into the rotation; the fact of growing barley would to some extent affect the wheat crops of the remaining course.

887. It would improve the wheat crops?—Yes, the estimate, not a matter of fact, but a matter of opinion.

888. Sir *E. M. Buller.*] What do you consider a fair produce per acre of barley?—Six quarters to the acre.

889. And what price would you calculate upon receiving for good barley?—Forty shillings a quarter.

890. What do you consider a good crop of wheat?—Five quarters to the acre.

891. How much a quarter would you get for that?—Latterly, we have been doing with 40 *s.* a quarter, but 5 *s.* 6 *d.* is the price that we have been calculating upon.

892. You would sell your wheat for as much as you would sell your barley?—Yes; but then the advantage would be, that we should expect to get more wheat in the two succeeding wheat crops of the rotation, than if we had taken a wheat crop after the barley.

893. Though you talk of barley being a more valuable crop than the wheat crop, practically it is not so if you look to the money produced, but if you look to the effect upon the succeeding crop, it is?—And in the advantage of barley straw for cattle compared with wheat straw.

894. Is that the case in the market?—It is not in the market, it is good for our own consumption; when we grow barley, we give barley straw with oilcake to our cattle. When we have no barley straw, we use the wheat straw; it is not the practice to sell straw.

895. Supposing you lay out the money in manure, there is no disadvantage in selling the wheat straw?—The disadvantage is, that you require it for your cattle.

896. Might you not very advantageously sell your straw, particularly if you live in a hunting country, and purchase either hay or oil cake, or other food for cattle?—I do both; I buy manure, and I use my own straw, selling hay and produce of farms, and laying out the money realised in oil cakes, and manure is beneficial to the farm.

897. Mr. *Hardcastle.*] Suppose that there were no malt tax, what proportion would you wish to have of barley?—On the light land one-fourth, on the better qualities of clay one-sixth.

898. Mr. *Surtees.*] What is the difference in cost of harvesting barley per acre as compared with harvesting wheat per acre?—I think that the difference is very slight. We always value the one the same as the other.

898.* The 50 *l.* a year you pay as malt duty, will be equal to a charge of 1 *s.* 4 *d.* an acre?—It is.

899. *Chairman.*] Have you heard of a Bill of Mr. Gladstone's, which is called the Malt by Weight Bill?—No, I have not.

900. There was another Bill of Mr. Gladstone's in reference to malt for feeding cattle?—Yes.

901. Have you had any experience of the working of that Act?—No, it has not been used in our district at all.

902. Have any houses been erected for that purpose, or used for that purpose in your district?—No; one maltster gave notice that if he had application for it, he would prepare the composition, but no one ever applied.

903. You never tried the mixture?—No.

904. You know what it was; a mixture of malt?—Yes.

905. By a return before us, it appears to have failed?—Yes, at least it answered the purpose of silencing the objection of the farmers, that the malt tax prevented its being used for food.

906. Have you tried malt alone as food for cattle?—No, I have not, but I am quite certain from all I have heard of those who have used it, that there is no advantage in it.

907. Would you rather feed with malt or with barley, supposing that there were no duty?—I should not go to the expense of malting it.

908. You would fed with barley?—Yes.

909. Have you fed any bullocks with malt?—No, nor do I approve of barley.

910. Have you fed sheep with malt?—No, and do not like barley.

911. Have you fed young lambs?—No, I have not used malt for any feeding purposes.

912. Not even prize bullocks?—No.

913. Have you seen some experiments that were made by order of the Government by Mr. Lawes?—I have seen them, but did not go into them.

914. You did not go into them sufficiently to give any opinion on the question, whether there was any practical advantage arising from them?—No.

915. On the whole, do you think that malt would be advantageous for feeding purposes, providing it had no duty on it?—I do not.

916. Mr. *Goschen.*] Was there an idea amongst you before the Act was passed that malt was useful for cattle?—No.

917. So that the cry for the Act did not come from your county?—No, I never heard it from my county.

918. You think that the Act has failed because it was made to remedy a grievance which turned out to be no grievance at all?—The cry had no foundation at all.

919. *Chairman.*] That is only your own opinion?—That is only my own opinion.

920. Mr. *Read.*] You have no sort of experience about it?—No.

921. You never used it?—No.

922. Not even as a condiment?—No.

923. Lord *Eustace Cecil.*] Do you feed as large quantities of cattle, do you suppose, as they do in the Eastern Counties generally?—I should say that we do not feed so many stabled cattle as they do in the Eastern Counties.

924. Do you feed as many sheep?—Yes.

925. Mr. *Read.*] Generally speaking, you do not use so much artificial food for feeding cattle as we do in the Eastern Counties?—More for sheep and less for bullocks.

926. Mr. *Dent.*]

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926. Mr. *Dent.*] You yourself have been a very large feeder of sheep?—Yes.

927. For the size of your farm, you feed a large proportion of sheep?—Yes.

928. Do you also feed a large number of bullocks?—No, only what we breed.

929. Therefore you, in speaking of the use of malt, at all events, for sheep, are not speaking as a man not in the habit of feeding them?—I do feed many.

930. And you have never thought it worth while trying malt, or trying the compound?—No.

931. Because you think that other food is cheaper?—Yes.

932. Mr. *More.*] Are you aware that some farmers have used malt extensively for feeding purposes?—Yes.

933. And some of the most successful?—I am not aware of any man who has gone on with it.

934. Mr. *Arthur Peel.*] Did the mixture of linseed and malt condiment affect that?—The mixture would improve it; but the impression was that the mixture could not be bought at such a price as would make it desirable; that, in fact, other food was cheaper.

935. Mr. *More.*] Do you know Mr. Henry Smith, of Sutton Manors?—Yes.

936. Do you know that he is one of the most successful feeders of sheep in England?—I do not know that; he gets some very good sheep, no doubt.

937. Have you ever heard that he attributed his success to malt?—I have heard that he attributed his success to Beach's condiment; I do not know whether there is malt in it.

938. *Chairman.*] Do you brew now for your people at haymaking and harvest?—Yes.

939. Of what strength?—Five bushels to 100 gallons.

940. Is it the custom generally now to brew for the people, or to give them malt?—To brew for them generally.

941. Do any of your people brew at home now?—Only one.

942. Supposing the duty was off, should you give your people malt, or should you still brew for them?—I should endeavour to give them malt. The one man I have referred to, who does brew for himself, is the shepherd.

943. You find him, I suppose, nothing but the malt?—I find him nothing but the malt.

944. Sir *E. M. Buller.*] Do you allow him to use your brewing utensils?—No, he brews himself.

945. *Chairman.*] Do you think that, supposing the duty was off, and you gave your labouring men a certain amount of malt, it would be very beneficial not only to themselves, but to their wives and families?—I do.

946. Do you think that they would each then be enabled to have a certain portion of beer a day, which now they never get at all?—Yes.

947. Therefore you think that if the malt tax was off, it would be a very great advantage to the labouring man?—Yes.

948. Is it the fact now that beer from the public-houses is exceedingly bad?—It has the credit of being so, and I have no doubt it is so.

949. Is it the fact in your county that the men come and ask you to let them have beer rather than give them the money to get the beer themselves at the public-houses?—No; I do not know that it comes to that. During the haymaking, harvesting, and thrashing, we allow the men beer now. Supposing the malt tax were repealed, we should allow them so much malt per annum, spread over the whole year; they would have their beer regularly at all times, whereas now during the winter months they get none.

950. Presuming that the men are obliged to drink beer at these times (as I believe they are obliged), would they rather have the beer which you find them, good home-brewed beer, or go to the public-house, and get the quality of beer which they find there?—I think, speaking of the beer alone, they would rather have my beer; but there are some special inducements to go to the public-house. Taking simply the two qualities of beer, they would rather have my beer.

951. I will put it in this way:—Supposing you put on half-a-dozen mowers, and you allow them so much beer of your own brewing, or so much money to go to the public-house to buy it, would they rather have yours or go there?—They would rather have mine.

952. Is not the public-house beer very injurious to health?—I believe so; it is supposed to be so; I do not speak from my own knowledge.

953. Farming largely as you do, I suppose that your men are the same as other people's men, and sometimes they go to the public-house for a lark; are they as fit the next day to do their work as they would be if they had drunk better beer?—No.

954. Do you think, in fact, that taking the duty off malt, even if it were placed upon beer, would be a boon to the farmer as well as to the poor man?—I think it may as well stay as it is; I do not see how we should benefit by that.

955. You mean that you think it might as well stay as it is as be placed upon beer?—Yes, I think I would rather recommend it as it is; I should not like to have the exciseman ascertainng what beer was going into my house.

956. We do not say anything about the exciseman; we simply ask you the fact whether, supposing it were put upon beer in a way that would interfere with you as little as possible, it would be a boon to you as well as the labouring man?—I do not see that a tax on beer, perhaps, would affect the prices of our inferior barley just as a tax on malt; I confess that I do not clearly see any advantage that would be gained personally.

957. You do not think that you would improve the price of your inferior barley by taking off the malt tax, and substituting it in some other way, even if it was upon beer?—Probably the tax on beer would not interfere so much with the price of barley as the tax on malt does.

958. Sir *E. M. Buller.*] Would you be kind enough to tell us what is the expense of brewing your beer; you brew five bushels of malt to one hundred gallons?—Five bushels of malt and five pounds of hops; you may put that as the whole expense; nine shillings a bushel is about our average price of malt, and hops vary to all sorts of prices; perhaps the average price of hops might be stated at a shilling a pound.

959. What is the expense of converting the malt into beer?—The grain surely about pays the expenses of that.

960. The yeast and the grain are sufficient to cover the expense of brewing?—Yes.

961. You would brew your 100 gallons at the rate of 2 *l.* 10 *s.*, with the malt tax as now existing?—Yes.

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962. Without the malt tax what would be the cost?—You would save the tax on malt and the maltster's profit; when we get 5 *s.* a bushel for our barley we generally have to give 9 *s.* for our malt.

963. Take your five bushels of barley, what would that be?—Taking it at 5 *s.* a bushel, it would be 25 *s.*

964. What would be the expense of turning it into malt?—I do not think that I could speak accurately upon that.

965. Do not you know that, practically, you can send barley to a maltster, and he return it to you, plus the duty?—Yes; the outcast would about pay the expenses.

966. In point of fact, there would be no expense in converting it?—No.

967. You would brew your 100 gallons of beer then for 1 *l.* 10 *s.* instead of 2 *l.* 10 *s.*?—Yes.

968. That would be the difference that the malt tax makes to you?—Yes.

969. You are also probably aware that the common and ordinary practice in brewing is to turn four bushels of malt into 72 gallons of beer; that is to say, 2 bushels into 36?—Yes.

970. Your proportion is 5 bushels to 100; that is 1 to 20, and the brewer's proportion is 1 to 18?—Yes.

971. Whereas you would be able to produce your beer at 1 *l.* 10 *s.* for 100 gallons, the brewer charges 1 *s.* a gallon for his beer when he sells it, and therefore would charge 5 *l.*; in other words, you would be able, were the malt tax removed, to supply 100 gallons of beer, of nearly the same strength as the brewer's (because you take 2 to 40, and they 2 to 36) at 1 *l.* 10 *s.*, while they would charge 5 *l.*?—It is so; the malt tax being repealed in the one case and not repealed in the other.

972. That is the effect of the malt tax, according to your statement; you are driven to apply to the maltster and the brewer, but if you were able to carry on the malting and brewing in your own premises, you would be able to produce at 1 *l.* 10 *s.* what the brewer charges 5 *l.* for?—Yes, assuming that to be the figure which the brewer charges; I can only speak for my own figures.

973. With regard to cottage brewing, are you of opinion that it would be practicable to supply every cottage with adequate brewing utensils?—Yes.

974. Do you think that beer would keep well in cottages where they have no cellars?—Yes, at the back, the shady side of the houses.

975. In order for beer to arrive at perfection it requires some time between the brewing and the consuming, does it not?—Not very much time; beer of the strength we are talking of does not require very much.

976. You think there would be no risk of the beer turning sour for the want of convenient places to keep it in?—I do not think so; they would soon find out how long they could keep it.

977. And do you think that the wives and children would get a considerable portion of that beer?—They would get some.

978. Now they get none?—Now they get none.

979. The labourer generally thinking that all the beer consumed by the family should go down his own throat?—Yes.

980. Mr. *Goschen.*] You say that if you were to brew your own beer without the malt tax, it would be 1 *l.* 10 *s.* a hundred gallons?—Yes.

981. The malt tax now is 1 *l.*?—Yes.

982. Therefore you are producing at 2 *l.* 10 *s.* what the brewers are charging 5 *l.* for?—If the brewers do charge that.

983. So that the difference of the effect of the malt tax is not between 1 *l.* 10 *s.* and 5 *l.*, but between 2 *l.* 10 *s.* and 5 *l.*?—The difference to me is, to raise mine from 1 *l.* 10 *s.* to 2 *l.* 10 *s.*; what difference it makes to the brewer I cannot say.

984. Still, from the figures of the honourable baronet, there must be a considerable difference between the cost of your beer, and the cost at which the publicans sell it now?—Yes.

985. Therefore it would be for the advantage of your men, if you supplied them with beer now?—Yes.

986. They would be able to get the beer at half price, if the honourable baronet is right in his figures?—Yes.

987. If they could store it away in their cottages?—Yes.

988. So that they would save the difference in cost and have nearly all the advantages that the repeal of the malt tax would give?—They would save the difference of the cost.

989. So that the result of the repeal of the malt tax will be a certain saving to the labourer in the cost of the beer?—Something more than that; under those circumstances, we should, as I have said before, provide him with beer or malt all the year round, whereas now, in consequence of the higher price of malt, we only give beer during haymaking, harvesting, and thrashing.

990. Why cannot you supply him all the year round, if you can produce the beer so much cheaper?—Simply because of the expense of it.

991. Still your expense is much less than that of the publican?—I know nothing about the publican, except that when the men receive their Saturday's wages, unfortunately, they go to the publican too often.

992. If the malt tax were reduced, you would be able to give them the beer cheaper?—Yes.

993. The wages would remain the same?—Yes.

994. And the labourer would have the advantage?—Yes; we should give them beer or malt in their own houses all the year round.

995. Then if the labourer had the benefit of it, you could not have the benefit of it also?—Yes, by the amount which it now costs us in the duty.

996. Then the labourer could not have it; you could not both have it?—The labourer would be advantaged in having a larger quantity, and having it all the year round.

997. If you supplied him with the larger quantity, that larger quantity would cost you the same as the smaller quantity now does?—Yes.

998. Therefore, the labourer would get the advantage?—Yes.

999. You would spend the pound which you saved in the malt duty in giving the labourer more beer?—Yes.

1000. Then the advantage would not be to you?—The advantage to me would be in having the labourers better able to do their work.

1001. Then you would not give all the 50 *l.* you saved to them?—No, not all of it.

1002. There would be a greater consumption of beer in the labouring class if the tax were repealed, you think?—Yes.

1003. Therefore, as far as you are interested in the repeal of the tax, you are rather interested in

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in it for the benefit of the labouring class?—Yes.

1004. So that you are disposed to limit the grievance to the farmer; it is not that it comes so much upon his own pocket, but that it weighs heavily upon a certain benefit which he would like to give to his labourers?—Under the present system it costs me 50 *l.*, and under the other system I should benefit in the improvement of the labourers.

1005. What arrangement would there be if you were to supply them with beer all the year round?—The arrangement would be that our permanent labourers should have two quarts of beer per day all the year round, with a double quantity for two months in the year, of haymaking and harvesting.

1006. And you think it a better arrangement that you should give a portion of the wages in beer, than that you should give it all in money?—I would give the same wages whether they had beer or not. What I would like to do, if I could, would be to give such an amount of malt as would represent the quantity; I have said two quarts per day, and double quantity at certain periods; let them brew it for themselves, and instead of drinking the two quarts, let the families have the benefit of it.

1007. But why cannot they buy the malt now and brew it for themselves; why should you not give it them in money?—If we give it them now it would add materially to the cost of our labour.

1008. If the malt duty were taken off, why should not the labourer buy the malt as he buys everything else, in place of receiving it in part payment of wages from you?—There is no reason why he should not; many farmers give a shilling a week less wages where they give the beer.

1009. Is it two quarts a day?—Yes.

1010. And do the labourers prefer having the money or the beer?—They would have the beer if they could.

1011. It is cheaper for them; they get more beer for their shilling?—They get more beer for their shilling than in any other way; but the farmers prefer giving the money.

1012. Do they prefer giving the shilling because it costs them less, or because they think it is a better system?—Because of the trouble of filling the bottles.

1013. If the malt tax were repealed, there would be that trouble all saved?—Yes, if we provided them with the malt.

1014. That would be one of the inducements?—Yes; we should convert our second quality of barley into malt, and supply our labourers with it.

1015. Would you make that part of the wages of the labourer, or sell it to him at cost price?—Sometimes one and sometimes the other. We should not compel them to take the malt; they would still have the option of taking as much malt as represents a shilling a week, or having the shilling a week, and laying out the money, and having the malt elsewhere, or in any way they pleased.

1016. Then at present you could supply the labourers with beer, notwithstanding the malt tax, if you were to pay them a little less wages; it is a question of price?—Yes.

1017. Do you think that that repeal of the malt tax would have really the effect of keeping the labourers away from the public-houses?—I do.

1018. But if the tax were put upon beer it would not have that effect?—Then they would not brew themselves.

1019. Have you turned your attention to the subject of a duty upon beer?—I think with regard to a tax upon beer that there must be some one to collect it, and that would be such a bar that the labourers would not brew it.

1020. I referred to the farmers?—I should object to that also.

1021. On the whole, do you prefer the present system of going to the maltster?—Yes, I do.

1022. Are you of opinion that ultimately the labourer would get the pecuniary advantage of taking off the malt duty?—Yes.

1023. Then it would be a question what duty weighed most heavily upon the labouring man, the malt duty or any other?—Yes.

1024. I understand your view to be this, that the malt duty interferes with the convenience of the farmer, but that in its pecuniary incidence it affects the labouring man?—It interferes with the price not of the best barley, but of the inferior barley; that is the way in which the farmers feel the result of the malt duty.

1025. If there was a duty upon beer, of course there would be no question that it was borne by the consumers of the beer?—There would be no question of that.

1026. Lord *Eustace Cecil.*] A good deal has been said about the grievance of the farmers by one honourable Member; but do not you think that if the beer were supplied from the public-house there would be a grievance in the shape of its adulteration?—I should say so.

1027. Your labourers would have a superior beer, if you supplied it?—They would have the same quality as we give them now at certain times.

1028. The consequence would be that they would be better able to perform a day's work?—Yes.

1029. Do you suppose that if the labourers were not furnished with malt by the farmers they would buy it themselves?—I think they would; with the reduction of the price, in most cases they would buy it cheaper from their employer than they would from the maltster.

1030. Do you think that they would calculate the advantages of having purer beer, and being able to supply their wives and children, rather than having the pleasure of drinking the beer at the public-house?—A great many of them; the best of them would, at any rate.

1031. In counties where malt was used for cattle, do not you think that the duty on beer would be an advantage; in Worcestershire, I think you said that malt was not used for feeding cattle; but in counties where malt was used for feeding cattle, do not you think that a duty on beer would be preferable?—If malt were used for feeding cattle, the substitution of a duty on beer for the duty on malt would be an advantage to those men.

1032. There is great difference of opinion on the subject, whether malt is preferable for feeding cattle or not?—I have heard it argued.

1033. You think that it is an open question?—I think it is a very open question.

1034. In those counties where the habit is to use malt for feeding cattle, a beer duty would be preferable?—I do not think it is the habit in any county.

1035. You think, then, that it is the case all over

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over the country that malt is not used for feeding cattle?—I think it is quite exceptional for it to be used; merely an experiment and nothing more.

1036. Colonel *Duncombe.*] Does cider take the place of beer in any extent in Worcester?—They drink both.

1037. And if the labourers could get pure beer, brewed either by the farmer or by themselves, that would be an advantage to them?—Yes; and I am much disposed to believe that if beer were cheaper from any cause there would be less cider made; the apples would be used for other purposes.

1038. It is your opinion that in Worcestershire the labourers might brew their own beer in their own cottages?—Yes.

1039. And also that they might not only provide themselves with beer, but their families too?—Yes.

1040. Major *W. Parker.*] May I ask what quantity of orchard land you have?—Nearly 20 acres.

1041. What quantity of cider do you on an average consume in the year?—It is difficult to give an accurate estimate; sometimes I have made 400 gallons to the acre, that is the largest crop.

1042. What do you value your cider at per gallon?—Sixpence per gallon.

1043. Do you export it?—No; we consume it all.

1044. Mr. *Surtees.*] You supply your labourers with cider?—Yes.

1045. To what extent?—Two quarts a day; it is a substitute for beer when we supply them with it.

1046. If the apples were not used for the cider, for what purpose would they be used?—They would go to Manchester for dying, for one purpose; we do send a great many more apples to market now than we did formerly, by reason of the facility of railway communication; but it would be the case to a greater extent if beer were cheaper.

1047. There would be more beer and less cider drunk if the malt tax were repealed?—Yes.

1048. Mr. *Read.*] You said that you did not give any less wages now when you gave beer; of course you expect either more work or a better quality of work?—We make no difference.

1049. But you expect either more work or a better quality of work in the harvest?—We fancy that we get better labourers when we give better wages.

1050. *Chairman.*] What are they now?—Twelve shillings a-week.

1051. Without beer?—Yes; in the haymaking, 15 *s.*

1052. Lord *Eustace Cecil.*] Do you give anything else to your labourers; do you supply them with coal or firing, for instance?—Our permanent labourers have cottages and gardens rent free, and double wages in harvest. Our regular men, shepherds and carters, have no means of increasing their wages beyond their daily pay; whereas our other men do their work by the piece, and those men can get more money.

1053. What do those who get their wages by the day make?—It would amount to between 16 *s.* and 17 *s.* a week; the other men vary very much; many of them get 1 *l.* a week.

1054. Mr. *Read.*] If you had a beer tax, you would very much object to it, if the exciseman had to superintend your brewing?—Yes, very much.

1055. But if you had to make a return of the quantity of malt brewed, and took out a license for it, would you very much object to that, supposing that the exciseman did not interfere with your business?—Is that practicable?

1056. Would you object to it, supposing it was?—No.

1057. If cottagers were exempt from this beer tax, it would be a very considerable saving to them?—Undoubtedly.

1058. If you had cheap malt, there would be less reason for adulteration of beer?—Yes.

1059. And if you had a beer tax instead of a malt tax, your second class barleys would be more available than they are now?—Yes.

1060. You said that the quality of beer now retailed at public houses is bad; it makes labourers thirsty and stupid, does it not?—Yes.

1061. Mr. *G. S. Lefevre.*] How many labourers do you employ in your farm?—At the present moment I have 42 or 43.

1062. Do they consume much cider besides beer?—At this time of the year they have a gallon of drink a day, two quarts of beer and two quarts of cider.

1063. Do you think that it would be possible for them to make the cider for themselves?—No.

1064. The substitution of a beer tax for the malt tax would, in fact, act as an exemption for the labouring man only if he brewed his own beer?—Technically it would be impossible; in the first place the beer tax would be a bar to brewing by the poor man; I am assuming that the exciseman must ascertain it at his own house.

1065. But you have stated that if the malt tax were repealed, you would give malt to your labourers, which they would brew themselves?—Yes.

1066. If a beer tax was substituted for the malt tax, that process would be impracticable?—Yes.

1067. Mr. *More.*] Did you ever hear that in Prussia poor men are exempt from all taxes on brewing?—No.

1068. Do you think that that would be satisfactory?—There could be no objection to that, I think.

1069. You say that Mr. Gladstone's Cattle Bill was the result of a cry; who raised the cry?—The farmers, who strenuously advocated the repeal of the malt duty, gave as one strong reason for it the importance of malt for feeding.

1070. Then you think that there was no ground for that reason?—I do think so.

1071. Do you mean to say that you think the farmers, as a class, are in the habit of raising cries or grievances which are groundless?—Farmers among other classes.

1072. That is not peculiar, then, to the farmer class?—No, though they have the credit of it.

1073. It is often said that these poor men have not the essentials for brewing; what is your opinion?—I think they might. With us it is very much the practice to have a bakehouse and washhouse to every four cottages; there would not be the slightest difficulty in it.

1074. It is easier to brew in larger quantities than it is in smaller, is it not?—No doubt.

1075. Do you think that it is quite possible for brewhouses to be erected for the use of a certain number of families in common?—The building which serves them as a bakehouse and washhouse would serve as a brewhouse.

1076. You

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1076. You do not see any difficulty in the way in regard to utensils?—Not the slightest.

1077. And you think that they are clever and accomplished enough to do it?—Yes.

1078. What class of wives do these men marry?—They vary very much.

1079. Are they people who are quite clever enough to conduct such business as brewing?—Yes; labourers, or their wives either, would, I think, be quite equal to that.

1080. Their wives are rather a class superior to themselves, are they not?—I do not know that.

1081. You think them quite competent to brew?—Yes.

1082. Mr. *Peel.*] Beer is a great item in the expenditure of a labouring man, as part of his domestic expenditure, is it not?—A man with no one but himself to keep, spends a large portion of his income at the beer shop; but, as a rule, men with families do not spend much. I could instance a great number of my men, who I am satisfied do not spend 5*s.* a year in the beer shop.

1083. Lord *Eustace Cecil.*] Then you supply them with beer?—Yes.

1084. Mr. *Peel.*] If the malt tax were repealed, would you, in your own special case, give out malt, or give them money to buy malt?—I should let them have their choice.

1085. Would the amount of malt served out be *pro tanto* in reduction of their wages?—As it is now.

1086. In the case of the malt tax being taken off, it would be so?—Yes.

1087. Would it be a possible result, that farm labourers would drink a great deal more beer, and not yet get less wages in cash?—No, the 1*s.* a week has always been considered the allowance, and we prefer to give the 1*s.* rather than give the beer.

1088. Mr. *Hardcastle.*] I understand you to say, that you give your labourers the beer at present in hay-time and harvest, and not the money?—Yes.

1089. Why is that; I suppose it is because you get value back again, and something more?—Because we cannot get them to work without.

1090. Why do you not give your labourers beer at other times?—Because we can get them to work without.

1091. Mr. *Dent.*] Some of your labourers do now brew for themselves, do they not?—The shepherd only.

1092. No one else?—No.

1093. Have any of your labourers at any time brewed for themselves?—Yes.

1094. Within your own knowledge recently?—Yes, but it is quite an exceptional case.

1095. *Chairman.*] You have never turned your attention to any substitute for the malt tax, have you; for example, taking it off malt and putting it upon beer?—No, not in that way.

1096. Supposing that any substitute which would not be one inconvenient to you were proposed; supposing, for instance, that in a relative proportion to the amount of house duty you pay, a duty was imposed upon you instead of the duty upon malt, would that be an offensive duty to you?—I would rather pay it in that way.

1097. Putting it on the assessed taxes would not be an offensive manner to you, as a private brewer, of collecting the duty, instead of the malt duty?—No.

1098. And if you were to consider the case in that point of view, you would see no objection, perhaps, to the duty being taken off malt and placed on beer?—I would rather see it placed on income, so far as I am concerned.

1099. The main question I wished to ask you was whether the answer which you gave on that subject was merely an answer given on the moment, you not having really considered the subject of the substitution of a beer tax for the malt tax?—Yes, with regard to the sale of barley it would be an improvement perhaps, but with regard to the annoyance I would rather pay it in any other shape.

1100. Sir *E. M. Buller.*] You say that the beer in public houses is adulterated?—Yes, it is generally supposed to be.

1101. Is the blame of that laid on the publican or the brewer?—The publican generally gets the credit of it.

1102. Do the publicans in your neighbourhood generally brew their own beer, or get it from a brewer?—They brew their own. And I know that when my men go and get drunk on it they are of very little use all the next day.

1103. You cannot say, perhaps, whether the beer at a public house which is supplied by a brewer, is or is not better generally than that supplied by a publican who brews his own beer?—I could not say.

1104. There is no advantage in going to a public house where it is home brewed?—No, I think not.

1105. So far as your experience goes, you would rather lay the blame upon the publican than upon the brewer?—Yes.

1106. Mr. *Goschen.*] Is bread much adulterated in the country districts by the bakers?—I should think not; I am not aware of it.

1107. Are there no complaints of bread being adulterated?—No.

1108. Is there much baking at home amongst the labourers?—Yes.

1109. I should like to know why the farmer should supply the labourer with any one particular article more than another; with beer, for instance, more than with bread?—The baking would have to be done twice a week, whereas the brewing is only once in three months.

1110. Do you approve of the system of the farmer paying a portion of the wages in kind?—No, we would rather pay in money all the year round, but the men will not have it; it has been attempted, and in one or two cases it succeeds, but it only succeeds where all the labourers are under the control of the farmer; that is to say, live in his confidence. Such a man can say to them, "I will give you money instead of beer." The men feel themselves more tied to a man in whose cottages they live, and would submit to a change of that sort, that they would not for an ordinary employer. If I were to say to my men, "I shall not give you the beer, but only the value," they would leave. There are only two in the neighbourhood that have succeeded in carrying out the system of giving no beer, and one of them is a Member of your House, Mr. Holland, the Member for Evesham; and the reason in his case is that all the labourers live in his cottages.

1111. In estimating the amount of expense in your brewing, do you simply take the men's time and the materials used?—I take the materials used, and charge for them against the men's time. We have the grains; they are about equal to the cost of the men's time and the coal.

1112. You would not think of charging a portion of

Mr. *C. Randall.*

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of your rent for that, on the ground that it occupies so much space?—No.

1113. There would be that difference, therefore, in the brewer's calculation and yours?—Yes.

1114. Yours is simply outlay on material?—Yes.

1115. Mr. *Read.*] Would your estimate include the cost of casks and utensils?—We are obliged to have casks, speaking of Worcestershire, for cider; our cider casks serve for beer at other times.

1116. Mr. *Goschen.*] Would you be afraid that if the malt tax were repealed, other substitutes might be found which would compete with barley in brewing?—No, I should not.

1117. As a grower of barley, you would not be afraid of a substitute, if all restrictions were removed?—No.

1118. Is not Indian corn very much adopted for brewing?—I am not aware whether it could be used.

1119. If there were a grain of that kind to compete, it would counterbalance very much the advantages you expect from the sale of your inferior class of barley?—If you could find a substitute of less cost.

1120. At present the brewers are confined to barley and sugar, as I understand?—If you could induce them to use other materials, they might compete with barley; but malt, not paying the tax, would be cheaper than it is now, and then there would be less inducements to use other articles than now, and the price of that barley might be raised.

1121. If there were no duty on the other articles, they would be able to compete on equal terms?—Supposing you had those articles equally good.

1122. Mr. *Read.*] May you not malt wheat?—By paying the duty, you may malt your wheat.

1123. Would you be afraid of the importation of foreign barley?—No.

1124. You are aware that this year, notwithstanding the inferior quality of the barley, the maltsters preferred the English barley to the foreign?—The English barley, unstained, undoubtedly.

1125. Did they even prefer English stained barley to foreign barley not stained?—Yes, I think so; excepting French barley, I think there is very little foreign barley that comes up to ours.

1126. Mr. *Surtees.*] Salle barley is very good, is it not?—Yes.

1127. What is the value of cider per gallon?—Sixpence.

1128. Is it a wholesome, nourishing beverage?—Wholesome; not very nourishing; where you have the most cider consumed you generally have the worst labourers.

1129. Sir *E. M. Buller.*] Are you aware that the drawback on beer, when exported, is 6*s.* a barrel?—I was not aware of that.

1130. And you have not turned your attention to the peculiar weight of taxation on beer rather than upon malt?—No.

Monday, 1*st July* 1867.

MEMBERS PRESENT:

Mr. Ayrton.
Colonel Barttelot.
Sir Edward Manningham Buller.
Mr. Stephen Cave.
Lord Eustace Cecil.
Mr. Dent.
Mr. Hardcastle.
Mr. More.
Major Parker.
Mr. Arthur Peel.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

Mr. ROBERT LACEY EVERETT, called in; and Examined.

Mr. *R. L. Everett.*

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1131. *Chairman.*] You live in Suffolk, do you not?—I do.

1132. In what part of Suffolk?—At Rushmere, close by Ipswich.

1133. What quantity of land do you farm?—I farm 140 acres of my own, and I am interested in 200 acres with my brother, as a tenant.

1134. Have you any occupation besides that of farming?—No.

1135. If I remember rightly, you obtained the first prize for the essay on the malt tax, which was awarded by the Midland Counties Association?—Yes.

1136. What year was that?—It was about two or three years ago.

1137. Therefore you have made the malt tax a study?—I have, considerably so.

1138. And you understand it in all its bearings?—I have endeavoured so to understand it.

1139. Is the part of Suffolk in which you reside a barley-growing country?—It is, decidedly.

1140. Is yours a barley farm?—Yes.

1141. Do you farm on the four-course system?—Yes.

1142. Can you grow the best quality of barley?—Not quite the best, but what comes into the class of the best.

1143. May it fairly be taken as the best quality of barley?—As belonging to the best class.

1144. As a rule, do you grow any inferior barley upon your farm?—Not as a rule; sometimes we do, in consequence of high farming.

1145. The weather, of course, has an effect upon it?—Sometimes we get it stained by the weather.

1146. What effect has the malt tax on the best barley?—In my opinion it depresses its price to some extent, and for this reason, that they can only brew the best ales from the best barley, and the malt duty is a considerable addition to the price of the barley, and therefore they are obliged to charge a higher price for their ales. If the duty were removed, the ales could be sold cheaper, and more largely consumed, and consequently the demand for that barley would increase. That barley is an article of very limited production, and the brewers now purchase what they can find of it all over the world, and, consequently, as we cannot increase the production, the demand being increased, I think the price must be increased also.

1147. It has been stated that instead of diminishing the price of the best barley by taking off the malt tax, it would increase it as much as 5 *s.* per quarter; is that your opinion?—I have estimated it at rather less than that usually; there would be an increase, I should imagine, of from 3 *s.* to 6 *s.* a quarter if the duty were taken off.

1148. What is the effect of the malt tax upon the inferior barleys?—It has the same effect, I imagine; it depresses their value, but whether it does so to a much larger extent than it does the value of the best, I have not a very decided opinion.

1149. Do you find any difficulty in selling your inferior barley?—We do.

1150. What is the price of the best quality of barley this year?—From 50 *s.* to 55 *s.* at the highest time, or perhaps I might say 50 *s.*; it is a very unusual year.

1151. It has been from 55 *s.* to 56 *s.*, has it not?—Yes.

1152. What was the second-class of barley sold at this year at the same period?—That which would be sold for malting I should suppose about 40 *s.* Then there was a lower class still used only for grinding, which would be from 32 *s.* to 34 *s.*

1153. That other class you might call a third-class of barley, used only for feeding purposes?—Yes, for feeding purposes, and for distilling purposes also.

1154. Then, according to your account, the difference between the second-class barley and the first-class barley this year was as much as from 15 *s.* to 16 *s.*?—Yes.

1155. Supposing the malt tax were taken off, what would then be the difference between the second-class barley and the first-class barley, in your opinion?—In my opinion, the difference would not very materially be lessened; I do not think there is much more difference in the relative prices of different qualities of malting barley than there is in the relative qualities of grinding wheat. Of course the duty does operate to some extent; it is easily shown by figures; a larger quantity of inferior barley is required to produce an equal extract, and therefore an additional amount of duty is paid upon it, and that must have some effect; but I do not think it has a very large effect differentially as between the two classes.

1156. But it would seem if those were all malting barleys a wide difference between 40 *s.* and

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and 55 *s.*, or 56 *s.* ?—There is a remarkably wide difference in the qualities of barley; no grain, I suppose, admits of so wide a variation.

1157. But, according to your evidence, an inferior class of barley is bought for malting?—Yes.

1158. Is it largely bought for malting?—I mean inferior as compared with the very best; I believe that the maltsters invariably buy the best barley they can get, and it depends upon the supply how low they go in the scale; and I imagine that if the duty were taken off, the consumption of malt would be most enormously increased, and therefore they would go considerably lower than they do now. The difference in the value of barley between malting barley and grinding barley is very wide; barley is worth much more for malting than it ever can be for grinding.

1159. Taking grinding barley, do you think that grinding barley would be malted supposing the malt tax were taken off?—They would be obliged to malt all the better class of it in order to get enough, in my opinion.

1160. But would there not be a difference between the second-class of malting barley and the grinding barley as to price?—I am not inclined to think that they would approach nearer than they do now by more than some 3 *s.* a quarter, perhaps; that is a matter which would depend upon the difference in the amount of extract between, say, five quarters of inferior barley, and that measure of the best, which would produce an equal extract.

1161. Then you do not think that barley, which is now selling at 24 *s.*, would be very much enhanced in price if the malt tax was taken off?—Only the better class of it; only in so far as the extraordinary demand made maltsters encroach upon that class of barley in the making of malt. There are some very remarkable figures that show the injury that the malt duty does us in lessening the demand for malt. In the average of 10 years, ending 1723, the consumption of malt per head in England and Wales was five bushels, whereas, at the present day, it is slightly over two bushels only.

1162. Do you attribute that diminution to the malt tax?—Yes.

1163. Or to other substances being used in lieu of malt?—The use of which substances I imagine is due to the effect of the malt tax; I think that is a very remarkable fact.

1164. Then are you of opinion that a maltster would buy nothing but the best class of barley at the present time, if he could get it?—Quite so.

1165. Mr. *Dent.*] Are you taking the average of 10 years now?—No; but if I did that would not alter the result in the slightest.

1166. *Chairman.*] Are you of opinion that, if the malt tax was taken off, the inferior class of barleys would command a better sale, and that they would be more used by the maltsters?—Most decidedly so; I believe that all classes of barley would be in greater demand; it is a necessity, as it appears to me.

1167. Sir *E. M. Buller.*] Then you would anticipate an increase in the value of all qualities of barley from the increased demand for, and consumption of it, for making beer?—Quite so.

1168. At the present time do you suppose that the whole of the barley at 40 *s.* is malted?—I imagine that that is comparatively a high price, and all that is bought at that price would be malted; that is above its grinding value. Barley which is sold at, say, 40 *s.*, would hardly be a class of barley which we should speak of as a low price barley, it would only be the lower class of the better barley.

1169. You mean that that which would be worth 40 *s.* would be malted?—I have no doubt whatever that it is so.

1170. Is there any great difference, that you are aware of, in the prices of malt made from one class of barley from that made of another class?—I am not acquainted with the price of malt, but they can only manufacture the superior pale ales from the very choicest barleys.

1171. Supposing there were a great increase in the price of barley, would you not anticipate a supply from abroad?—There would be, and there is now; but it has appeared to me that, in the event of any increase in the price of barley, we should share equally with the foreigners, and share most largely, because we are much the largest producers.

1172. Still, so far as the additional supply was brought in, that would naturally prevent, would it not, the full effect of the increased demand for English barley for malting purposes?—If they could send a class of barley which would come into competition with us it would. But unless the price increased, there would be no more inducement for them to import more than they import at this time.

1173. Do you imagine that the great increase of the demand for malt would bring into use as malting barley any considerable quantity of that barley which is now sold as grinding barley?—I think it would bring into use a very large quantity of it.

1174. Do you think it would be economically used?—It would make excellent malt and beer; maltsters would of course still prefer the best, and give the highest price for the best; but instead of using sugar and coculus indicus, and articles of that kind, as is now largely done, I imagine, that they would prefer the malt.

1175. Is it not the case that grinding barley sold at 34 *s.* is generally barley which has sprouted?—No, I think, by no means. There is a large quantity grown which is thinner than the best barley; and some of that is what we call "steely," not of so kindly a nature.

1176. Of course, that is from the accident of the soil and the weather?—Yes, the soil and the climate. I think the different counties of England vary a good deal in their climate.

1177. But is there any barley sold as low as 34 *s.*, with all the large grains sprouting, which would make good malt, and no loss from that circumstance?—I imagine that there is a large quantity of that kind of barley which would make good malt, and which now is sold at those low prices owing to the narrow demand caused by the duty.

1178. What would be the great difference, as far as you are aware, in the malt made from this inferior barley and that made from the first-rate barley; that is to say, what quantity of barley at 34 *s.* would, when made into malt, go as far as any certain quantity of malt made from that at 50 *s.* and 56 *s.* a quarter?—I am not able to answer that question; I imagine it would make very nearly an equal quality, but it would have to be used in a larger quantity.

1179. Supposing the quantity of saccharine matter to be the same, if you extracted from a larger quantity of inferior malt the same quantity of saccharine matter that you get from superior malt would there be any great difference in the quality of the beer so far as you are aware?—I do not imagine that there would be a great difference, but I think there would be some difference in the quality of the beer, because the very best barley is an article of a kindlier nature altogether. There is something in certain soils and certain situations that is eminently favourable for growing the very highest class of barley.

1180. But the beer that you get from the 34*s.* class you think would be just as good beer?—For the common people I think it would be just as good.

1181. Would it be as bright?—I do not know.

1182. Are you acquainted with the quality of barley called bigg, which is grown extensively in Scotland?—I am not; that has never come under my observation.

1183. With regard to the quantity of malt consumed per head you state that it was five bushels before 1723, and that now it is only two bushels?—Yes, two and a fraction.

1184. But you do not attribute that entirely to the difficulty of obtaining beer, do you; is it not in some degree to be attributed to the change of habit and the preference for other kinds of drink?—In Mr. Gladstone's Budget speech in 1866, he said that he had reason to suppose that the amount of beer consumed per head at the present time was equal to what was consumed then. He carefully spoke of beer rather than malt, in order that gentlemen might not see the way in which we barley producers were injured.

1185. Would you have the goodness to give us your opinion rather than that of Mr. Gladstone's?—It is supposed on authority that the amount of beer consumed per head in this country now is the same as it was in 1723; but that there were then five bushels of malt per head consumed, whereas now there is a fraction only over two bushels.

1186. Do you think that that is due to the improvement in the process of brewing, and that we can make equally good beer from two bushels to what our ancestors could make from five?—I am afraid that we are more expert in adulteration, and I account for it principally in that way. I suppose that beer is drunk weaker now, and larger quantities of pale ales are consumed, but that would not nearly account for that immense disproportion.

1187. Major *Parker.*] What is the weight of barley which you describe as selling during the past year, sometimes at as high a price as 53*s.* and 56*s.* a quarter?—It would vary from 15 to 16 stones of 14 lbs. weight for four bushels.

1188. What would be the weight of that which sells at 40*s.*?—I imagine that often it would be quite as heavy as the other.

1189. And the 36*s.*?—That would be as heavy too as the best often, sometimes I think, or very nearly so. It is the quality of the barley which affects its malting value, and that does not altogether depend upon its weight.

1190. Mr. *Surtees.*] What do you suppose would be the lightest weight of barley that was worth while converting into malt?—I should think barley of about 13 stones per coomb of four bushels would be as low as would be worth converting.

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1191. So that there would be a difference of between 13 stone for the lightest, and 16 stone for the best?—Yes, something like that.

1192. What quantity of the best barley do you think can be grown per acre under the most favourable circumstances in your best barley-growing land?—I have grown 7½ quarters, but we reckon 6½ quarters a good average.

1193. You have referred to sprouted barley; when grains have sprouted, do they not turn mouldy when they are being malted with good barley?—They do.

1194. And they spoil those grains which are near them?—Yes.

1195. And thus spoil the quality of the malt?—Yes.

1196. Mr. *Read.*] I think you stated that the weight had not very much to do with the improved quality of the barley?—No, I do not think it has.

1197. You might have barley of 14½ stone worth as much per coomb as that at 16?—I think it is quite possible.

1198. You gave the prices of last year, namely, the extreme value of the best malting barley at 56*s.*, the second at 40*s.*, and the grinding at 32*s.* per quarter; you would consider those exceptional prices, would you not?—Quite so.

1199. Probably you would think that 38*s.*, 30*s.*, and 24*s.* would more properly represent the average price of those barleys?—Yes, that would be very near the average; perhaps you ought to set the first figure a little higher, and say 40*s.* for the very picked of all.

1200. Is there not a greater difference this year between the prices of the very best and second sorts than there ever was before?—Probably there is, because it was known to be scarce, and those who must have the best article made desperate efforts to lay hands upon it.

1201. I suppose you, as a farmer, know that we have to thank the bitter beer brewers for that?—Quite so.

1202. Is the limited growth of the best barley confined to the Eastern Counties, or is it general all over England, do you suppose?—I imagine that in the Eastern Counties we have the monopoly of the best barley very nearly; we are eminently favourably situated for the growing of the best barley.

1203. Notwithstanding that you have that monopoly, you do not object to the repeal of the malt tax?—I am perfectly certain that the repeal of the malt tax would increase the value of the best barley.

1204. And you do not think that the area of the growth of the best barley could be very considerably increased?—I do not think it could be increased at all.

1205. *Chairman.*] What other counties do you consider could grow the best barley besides the Eastern Counties?—I am not aware that any can; Yorkshire, I suppose, can; but that would perhaps be considered an eastern county. I think they grow some very good barley in Yorkshire.

1206. Mr. *Dent.*] Do you speak from any practical experience of the Yorkshire barley?—I do not, only from inquires that I have made there upon the subject.

1207. Mr. *Read.*] Have you any idea of the wages that were paid for agricultural labour in the year 1723?—No, I have not.

1208. Do you not consider that the importation of cheap wines and tea has had something to

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do with the diminishing of the quantity of malt consumed?—I do not think it has, because the great authority, Mr. Gladstone, stated that as much beer per head is consumed now as then.

1209. Have you any idea of what was the consumption of malt during the Crimean war, when the duty was largely increased?—It felt the raising of the duty immediately; as the duty was raised the amount of malt consumed diminished, and I imagine that the consumption of beer continued quite equal.

1210. Mr. *Dent.*] That is your imagination, I presume?—I know no reason why it should have altered, as the retail price of beer continued unaltered.

1211. Mr. *Read.*] Do you know that there are returns showing the quantity of beer that was made during that period?—I suppose there are, but I have not referred to those returns; but I think there would not be such returns before the hop duty was repealed; I am not, however, certain upon that point.

1212. If there was a largely increased importation of foreign barley, you imagine that in all probability the importation of other grain would be somewhat diminished?—I think it would; that would be so, because they would be tempted to grow barley instead of wheat.

1213. And if we were to grow a great deal more barley we should supplant some other grain?—That is a necessary consequence in England.

1214. And in all probability the price of those other grains might rise a little?—I should imagine that the increased consumption of barley would not be sufficient to affect appreciably the supply of an article like wheat produced all the world over.

1215. Mr. *More.*] What is the test of barley being of the best quality?—It should be plump, and with a very thin skin; I do not know that I could give any better description.

1216. But what qualities must it contain?—I cannot speak with regard to its chemical qualities; I judge simply from the sight of the sample.

1217. How do you account for the amount of first-class barley grown in England being so limited?—It is owing to its requiring a certain soil and a certain climate.

1218. Do you suppose that any or that much of the best barley could be grown in foreign countries?—I am told that every quarter that can be bought there is now bought up by our pale-ale brewers, who have agents in France and Germany.

1219. But is as good barley grown in France as in Norfolk and Suffolk?—No, decidedly not.

1220. Mr. *Hardcastle.*] With regard to foreign barley, supposing the malt tax were repealed, do you not think that the importation of foreign barley would be very much increased?—It certainly would not increase, except the price of barley increased; if the price of barley increased, I have no doubt that the importation of barley would increase.

1221. You stated, did you not, that the price of barley would increase?—In my opinion it would.

1222. Then although the tendency of the abolition of the malt tax would be, in your opinion, to raise the price of barley, that tendency would be met by an increased importation?—I imagine that it would be only very partially met in that way, because barley grown in this country is better for malting purposes, and therefore would always take the top place; and with the abolition of the duty would come an immense increase of the consumption of malt, and the best barley would still be sold at the best price, so that the chief advantage of that, therefore, would remain with the English producers.

1223. I do not quite understand what you mean by the best barley, because, supposing no malt duty to exist, it does not seem to me that there would be very much difference between all kinds of malting barley; there would be a little more labour in producing the malt from the inferior kinds, but would there be any other difference?—I am informed that they can only produce the best pale ales from the very primest barleys, and I judged that the same thing acts downwards the whole way through, that you would produce a better article from the superior quality of barley.

1224. But you do not say that from knowledge?—No, not from practical knowledge.

1225. You are probably aware that there have been some returns presented to Parliament with regard to land under crops in England, and also in foreign countries; have you seen those returns?—I have seen them, but I do not retain in my memory the figures.

1226. If I were to tell you that the barley acreage of Great Britain and Ireland was only about three per cent. of the whole of the continental corn acreage from those countries which are the principal barley growing countries, should you be surprised?—If I understand the question to be, that the total acreage of the barley which we grow in England is but three per cent. of the land under corn cultivation on the Continent, that would be pretty much what I suppose, because, as I have been informed, no country is so favourable for the growth of barley as England, and on the Continent they can grow wheat to fetch more money than the barley that they can grow, because of the comparatively inferior quality of the latter.

1227. But supposing your anticipations were to turn out to be correct, and the price of barley should rise in consequence of the abolition of the malt duty, would not they then be induced to grow barley on the Continent?—I do not think the rise would be sufficient; I have estimated the rise at from 3 *s.* to 6 *s.* a quarter, and that would not make a sufficient difference between the value of wheat and the value of barley to them as to induce them to extend the growth of barley.

1228. Do you think that no foreign barley of any amount, or foreign malt, would be produced if the malt tax were abolished?—I do not think that any very largely increased quantity would be produced.

1229. On what do you found that opinion?—Because our barley, I have always been told by maltsters, works more kindly than the foreign barley, and in my opinion they would descend into the lower qualities of our barley rather than have the better-looking foreign barley. Also we have this striking fact: since the introduction of free trade, while foreign importations have largely reduced the price of wheat, the price of barley has been increasing.

1230. Mr. *Dent.*] May I ask you what is your occupation?—I am a farmer, solely.

1231. Have you farmed any great quantity of land?—No; I farm 140 acres of my own, and with my brother I farm some 200 acres in addition.

1232. Altogether you and your brother only farm about 400 acres?—Less than that.

1233. Have you been at all a buyer of barley?—No; not at all.

1234. Have you ever had anything to do with the malting trade?—No, not practically.

1235. Have you never been in a maltster's establishment at all, to see the working of it and to study it?—No, not to understand it.

1236. Have you ever had anything to do with the brewing trade?—No.

1237. Then where, may I ask you, have you got your authority on the subject of the malt duty?—From diligent inquiry and reading. For some years past my attention has been called to the question, and I imagine that I have as large a general knowledge upon the subject as most people.

1238. But it would be entirely a theoretical knowledge?—In one sense it is, but it is all based upon practical truth.

1239. Pardon me; if I understand you rightly, you have no practical knowledge of malt, and no practical knowledge of brewing, and you farm between 300 and 400 acres with your brother?—Yes, but if you ask a maltster or brewer, an honourable man, and he gives you information, that is as valuable as though you had a practical acquaintance yourself with the subject.

1240. With respect to the decrease in the quantity of malt used, I think you said that you did not attribute it much to improvement in brewing?—I have no doubt that that has its influence.

1241. But you attribute it mainly, do you not, to adulteration?—Most largely.

1242. What substances do you conceive are mainly used in adulteration?—Sugar is by far the largest; coculus indicus to make it intoxicating, and grains of paradise with partly the same effect, and salt, in order to increase people's thirst who drink the beer.

1243. And those adulterations, I believe you consider, do you not, are principally done by the publicans?—I believe almost entirely, except as regards the sugar.

1244. You have stated that you do not think that the price of the best barley will be at all depressed but rather raised?—I feel very confident of it.

1245. And that you imagine could arise from increased consumption?—From the increased consumption of pale ale, and the consequently increased demand for best barley.

1246. According to your theory that you can only brew the best pale ale from the best barley, and that the best barley can only be produced in very limited quantities in particular districts of England, the quantity of pale ale produced must be limited?—Yes, of the best quality.

1247. And, therefore, the price must be increased, must it not?—It would come to a slightly lower quality, I imagine.

1248. You say that the price of the best barley is to be increased by the reduction of the malt tax, because of the increased consumption of beer, and yet, according to your own account, the production of pale ale must be limited?—I do not imagine that there is a hard line to be drawn that you could take a certain sample of barley and say, this will be for pale ale, and of another, a shade or two lower, that this will not. You would get from the best barley the best article, but still you would get a good article to go several shades lower than you have any necessity to do at present.

1249. But in order to get that second-rate article, would not the foreign barleys come into very active competition with our home-grown barleys?—They are used already in our beer trade if I am not misinformed, at least the choicest of them are.

1250. In all probability if the malt duty were taken off they would come in in still greater quantities, would they not?—Yes, still keeping abreast with our own.

1251. And keeping down the price of the inferior barley surely?—I do not think they could send sufficient to do that. I wish to know the truth in that respect, and I would very readily alter my opinion upon sound data.

1252. Do you think that the difference of price between the inferior qualities and the best qualities of barley differ so very much from the variation in price between the very best and the worst wheats?—There is a wider difference in the relative prices of barley than of other grain; it admits of a much wider difference of quality, and that difference in price, no doubt you can see by the figures, must be increased by the malt tax, but I do not think it is increased to any very great extent. You require more measure of the cheapest inferior barley to get the same extract than of the best, and, therefore, you pay a larger amount of malt duties; to that extent the price must be increased.

1252.* You think that in all probability if foreigners sent us a larger quantity of barley, that would diminish the import of other foreign grain?—To a very fractional degree.

1253. Have you not found that a trifling rise in the price of wheat will bring wheat from California and Australia?—Yes; the whole world is open with regard to wheat.

1254. You seem to think that all foreign barley is of very inferior quality; are you not aware that Bavarian beer and some of the beer in Germany is very good?—I have not tasted it; I have been informed that it is a very pleasant drink, but much less strong than our English beer.

1255. *Chairman.*] If you had your choice to drink Bavarian beer or well-brewed English beer, which should you prefer?—Not having tasted the foreign beer, I cannot certainly give any opinion upon it.

1256. I think you have stated that there is a very limited quantity of the best barley grown in England?—Quite so.

1257. And there is a still more limited quantity of best barley grown abroad?—That is the fact.

1258. And that therefore the demand for those pale ales being on the increase, the price of the best barley would keep up, and, in fact, would increase if the malt tax were taken off?—I am very confident of that.

1259. Do you know where the best foreign barleys come from?—Not the places; there is some bought in France, and some in Germany, but I do not know the particular localities.

1260. You have never studied that part of the subject?—No, I have not.

1261. Do you know that barley does not travel well?—I have been informed that it is injured for

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for malting purposes by a sea voyage; by crossing the Channel, in fact.

1262. Supposing the malt tax were taken off, and the malt were made abroad, do you think it would injure the home malting trade?—That is an argument by which maltsters have endeavoured to induce us to give up agitating the question of the repeal of the malt tax. I have turned my attention to the subject, and it seems to me that the difference between the present import duty on foreign malt and the duty on malt made in England is so very slight, that if there would be any great advantage in malting foreign barley abroad rather than here, it would be practised now; there is only a difference of some 3 *s.* per quarter between the import duty and the duty charged in this country; and then the foreigners have an advantage, because they can bond the foreign malt, and keep it for any length of time without paying the duty, I believe, which we are not allowed to do with English malt.

1263. Do you know, or do you not know, that the climate of England is peculiarly favourable for malting purposes, much more so than foreign climates?—I am informed that it is more favourable for malting purposes.

1264. Can you give us the comparative price of foreign barley as against those prices which you have given us before; for instance, when your best barley was at 55 *s.* and 56 *s.*, what was the price of the best foreign barley, when the inferior barley in England was worth 40 *s.* a quarter, what was the price of that quality of foreign barley and the same with regard to grinding barley?—I am not able to say what price is given for the best foreign barley; such foreign barley as I have personally seen brought on to the Ipswich market has always come into the grinding class, into what this year would be the 32 *s.* class.

1265. Practically, none of the best foreign barley comes into Ipswich market?—I believe not; it is taken up by the great pale ale brewers.

1266. And you have not turned your attention to the comparative price of foreign and English barley in the open market?—I have not.

1267. Mr. *Ayrton.*] I presume you grow more barley in your county than you use there?—Vastly more.

1268. Therefore, you are exporters and not importers of barley? — Quite so; all our malt comes to London, or the great bulk of it.

1269. What makes you think the foreign barley is not equal in quality to home-grown barley?—It is usually steelly, and will not work kindly upon the malting-floors. I have seen samples of it in our Ipswich market, which, if it had been English barley, would have sold readily for malting, but which the maltsters declined to use, because they found that it would not work so well.

1270. Have you had any experience yourself of foreign beer?—I have not, I am sorry to say.

1271. If you were told that from foreign barley ale is extensively made abroad, which is considered by many to be just as good or better than our own, would that modify your opinion with regard to foreign barley?—I know that Bavarian ale is considered to be a very beautiful drink, but some of my friends who have tasted it say that there is not that body in the foreign ales which there usually is in English ales.

1272. Do you pay your people wages in drink or in malt?—No, we pay them in money, but in hay time and harvest we allow them malt.

1273. Do the men themselves make the beer out of the malt?—Yes, all my labourers do, and I believe all the labourers in the parish do so when they have the malt given them.

1274. Do they make it in their own cottages?—Yes.

1275. Have they a brew-house fitted up for the purpose or do they use the wash-house?—They use the best place they can; one of their rooms usually.

1276. Are there any fittings specially adapted for brewing in their houses?—I am not aware that there are. A copper is all they require, and that most of them have.

1277. Major *Parker.*] A good many questions have been asked of you as to your competency to give evidence on the questions under consideration; you have already stated that you wrote an essay on the subject?—Yes, an essay to which the first prize was given.

1278. To whom was that essay submitted for consideration?—A prize was offered by the Midland Counties Anti-Malt Tax Association, and they appointed judges, and in the letter which I received I was informed that they had not the least hesitation in awarding me the prize.

1279. Do you remember who the judges were?—I do not, but I have never met with any statement in the essay that has yet been controverted; and I have tried to look at all that could be said upon the subject both for and against.

1280. Was there an advertisement in the public journals offering a premium to the individual who would produce the best essay on the subject of the malt tax?—There was an advertisement to that effect in the public papers; it was in all the agricultural papers, I think.

1281. And in consequence of reading that advertisement did you prepare your essay?—Entirely so, in public competition.

1282. Have you any recollection as to the number of competitors?—There were about 40, I think.

1283. Do you remember where those parties resided, or any of them?—That was not made public.

1284. But the essay was written in consequence of a public advertisement inviting competition throughout England without limit?—Yes, without any limit, and it was made known all through England, I believe.

1285. You submitted your views in an essay which, as you have already said, received a premium; what was the amount of that premium?—£. 40.

1286. Did you receive with it any communication?—I received a communication stating that they had awarded the prize to my essay without any hesitation.

1287. *Chairman.*] Have you one of those essays with you?—I have.—(*Delivering in the same.*)

1288. Mr. *Surtees.*] Supposing the malt tax to be repealed, and the price of the best barley increased, and also the consumption of the best beer increased, would not the amount of the reduction of the malt duty be much more than equal to the increase of price of the best barley?—I quite think it would; barley would not rise in price equal to the amount of duty which is now chargeable upon it, or anything like it; and the consumer would reap a large benefit as well as the producer.

1289. Does malt bear a sea voyage well?—I believe it does.

1290. As

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1290. As well as barley?—Much better than barley.

1291. Mr. *Read.*] Had we an average crop of barley last year?—No, an inferior crop in quantity.

1292. And it was very much damaged by the weather?—It was exceedingly damaged by the wet.

1293. Was not all the barley, which you say was sold at 40 *s.*, all more or less stained?—Yes.

1294. Are you aware that in foreign countries they had an average harvest?—Yes.

1295. Notwithstanding that our barley was so very much damaged the maltsters, this year, bought very keenly stained barley rather than buy the foreigners'?—Yes, they have done so.

1296. Consequently you do not apprehend very much from the importation of foreign barley?—I am not at all afraid of foreigners with regard to barley.

1297. Do you know, in your own locality, Ipswich, what the maltsters buy?—Yes; it is a matter of common knowledge to what extent barley is bought.

1298. Mr. *Dent.*] You have stated, in answer to the honourable Member for the Tower Hamlets, that yours is an exporting county for barley, therefore it is hardly likely that the best foreign barley would be brought to Ipswich to compete with your barley?—It is a great malting county also.

1299. Is Ipswich a large importing port for corn?—It is; when I say large, that is a relative term.

1300. Your knowledge of the markets is derived from the Ipswich markets, you do not speak of Mark Lane?—No.

1301. Mr. *Hardcastle.*] You do not say that Ipswich is a large importing market?—That is a relative term; it is of course not large compared with London.

1302. Mr. *More.*] What was the subject of the essay for which you obtained the prize?—It was simply the advantages of the repeal of the malt tax, or the injury caused by the tax; that was the general subject of it.

1303. You did not think it necessary, in writing an essay upon that subject, to compare the circumstances of the crop of barley in England with that on the Continent?—No.

1304. And the inquiries that you then made were not extended to the circumstances of either the growth of barley or the production of malt in foreign countries?—Ever since this question has been before me, I have neglected no opportunity of gaining all the honest information that was in my power; and I have endeavoured to inquire on both sides.

1305. My question is, have you extended those inquiries to the circumstances under which barley is both grown and malted on the Continent?—I have to some extent.

1306. And yet you have declined to reply to any questions which have been put to you upon that subject?—I could not say the price that is paid for it.

1307. You do not consider yourself an equal authority upon the subject of the growth of barley on the Continent as you are in England?—No further than to this extent. I know that all the better class of foreign barley is bought and brought to England.

1308. Mr. *Hardcastle.*] Do you know the proportion between the acreage under corn and the acreage under barley in England?—I do not know that. We always in my district have grown one quarter of our arable land in barley, but that custom diminishes as you get out of the eastern counties. The proportion is given in the agricultural returns which have been published, but I do not remember the figures.

1309. Would you be surprised if you were told that the acreage in England was very nearly one quarter?—Yes, I should of the arable land.

1310. With regard to the continental acreage would you be surprised if you were told that the barley acreage was less than 10 per cent. as compared with the corn acreage?—No, I can quite suppose that. I have always understood that barley is an exceptional crop there, that it is exceptional to find it cultivated rather than otherwise.

1311. You think it is an exceptional crop; are you aware that very nearly 8,000,000 acres are under barley cultivation in the countries from which the returns are given?—I am not.

1312. If there is that amount of land under cultivation in Denmark, Wurtemburg, Bavaria, Hungary, Holland, Belgium, France, Austria, and Sweden, you can hardly call that an exceptional crop?—The total acreage under corn cultivation on the Continent would be something prodigious.

1313. Does not it occur to you that if there were only a comparatively small increase in the value of barley in England, it would be exceedingly easy for the foreign growers to alter their shift so as to increase the acreage in but a small proportion, and yet very largely to increase the quantity of their growth of barley?—They could do so, but I do not think the temptation would be sufficient to them. Wheat they can grow good, but barley they cannot grow good; and although the price of barley would increase, it would not increase enough to make it a better paying crop than wheat to them. Since we have had free trade in corn they have not kept the price of barley from rising.

1314. *Chairman.*] Have you ever been abroad?—Only to Antwerp.

1315. Then you do not understand their mode of cultivation?—No, I do not.

1316. Mr. *Ayrton.*] Have you an estimate of the per-centage of the different qualities of barley grown in your own district, or county; how much of each quality is grown do you suppose relatively; would it be one-half the best quality, or what would be the proportion?—There would be a small quantity of the very best, the largest quantity would be of such as is usually used for ordinary malting purposes, and the quantity of the inferior of all would be about equal to the very best, I should think.

1317. What would the proportion be?—We might say a quarter of the very best, a half of the middling malting barley, and a quarter of the grinding barley.

1318. When you use the term middling malting barley, and the very best, what difference would there be in price between those two generally, not speaking of last year?—A difference of about 6 *s.* or 8 *s.* per quarter, I should think.

1319. *Chairman.*] With regard to the rotation of crops; do you think that the malt tax interferes with the proper rotation of crops?—I have been informed by many farmers in different neighbourhoods

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bourhoods that it does. Where I reside we grow such good barley that we pursue the four-course shift now.

1320. Have you no practical knowledge upon that point?—No.

1321. Do you know anything of Mr. Gladstone's Malt by Weight Act?—Yes, I have read its provisions.

1322. How has that Act worked in your district?—It has been made use of to some extent, and as far as it goes, it tends to equalise the unequal pressure of the malt duty; it has a slight tendency that way.

1323. Has it improved the sale of the higher class of barleys?—I think the difference is so very slight that we can see no practical result from it.

1324. Has it been much used in your neighbourhood?—I do not know to what extent; I know some maltsters who use it; but whether it is generally adopted, I do not know.

1325. Do you know from your experience whether it is the foreign barleys or the home-grown barleys which mostly come under those provisions?—I do not know.

1326. Have you had any experience of Mr. Gladstone's Act for the feeding of cattle with malt?—I have not used any of the mixture myself.

1327. You have had no practical experience of the working of that Act?—I can speak thus far practically, that if it had not been rendered compulsory to grind the malt into such a fine powder I should have used it. I should have used it for feeding sheep in the open air; but as we have generally more or less wind, I should have expected that in using that fine powder a large proportion would be blown away instead of finding its way to the bottom of the trough.

1328. Are you aware that it has failed throughout the country?—It has not been largely taken advantage of.

1329. Have you ever tried malt alone as food for cattle?—I have not myself, although I have ade extensive inquiries as to its use.

1330. Have you never fed bullocks with malt?—I have not used it in any way.

1331. Nor sheep?—No.

1332. Nor lambs?—No.

1333. Do you show any bullocks for prizes?—No.

1334. Do you think, on the whole, that malt is an advantageous food for cattle, provided there were no duty upon it?—I have not the least doubt of it.

1335. Why do you think it is an advantageous food for cattle?—Malt is eaten more greedily than any other food. I think when you want to tempt animals to eat, or when you have them slightly ailing, a mixture of malt is of very great value. Also a neighbour of mine made experiments in using barley in its raw state, and barley in its malted state, and he clearly proved that malted barley would raise mutton, I think, a ½ *d.* or 1 *d.* a pound cheaper than unmalted barley.

1336. Have you ever seen a return of the experiments made, by order of the Board of Trade, by Mr. Laws?—I have, but I have never studied them. I have seen this pointed out in them, that in some cases he used two classes of barley, a better and a worse class, and he proved by experiments that the worst barley did more good than the best barley, which is quite contrary to sense and reason; and I have had so many testimonies before me of the value of malt in various ways for feeding, that I am perfectly certain that it is valuable.

1337. Do you think it is valuable for its feeding properties alone, or that it is valuable as an accessory with other things?—As a mixture principally, I think. There is one practical fact which has come under my observation, and under the observation of all gentlemen who are interested in agriculture, that is, that the barley which is left on our stubbles, when it is in a dry state, we find to be of very little good to the stock that feed on it; but afterwards, when the barley is ready to sprout, we find it very much better for the cattle; that is a practical fact known to every farmer.

1338. But you are aware, are you not, that you may do that to a certain point now; that is to say, you may wet your barley up to a certain point?—Yes, we may, but I believe we may not dry it without a great deal of special arrangement.

1339. Do you brew for your people for haying and harvest?—We usually allow them the malt to brew for themselves.

1340. Do they brew for themselves?—Yes, they do.

1341. What strength is the beer that they generally brew for themselves?—About 18 or 20 gallons to the bushel.

1342. Is it a general custom in your part of the country to give malt to the men, or to give them beer during haying and harvest?—We usually give them malt at hay time and harvest.

1343. As a rule, throughout the year do many or any of your men brew for themselves?—A few do, and those are invariably the upper class amongst our labourers, but they are comparatively few.

1344. Supposing the duty were taken off malt, do you think it would be a great advantage to labouring men?—I believe it would be an enormous advantage to agricultural labourers.

1345. Is the public-house beer in your part of the country very bad?—Comparatively, I should think it is much the same as in other counties, but it is not like our own beer; the men do not find it so wholesome as our own beer.

1346. Do you consider that public-house beer is very injurious to a man's health?—Not very; I consider it injurious if you put it in that form. I have noticed this: many of our men belong to a club, and once a year they have a club feast, and I have heard them complain bitterly the morning after the club feast of thirst and headache, and I never heard them complain of such a thing from our own beer.

1347. Do you think if the tax were taken off malt that the poor man would brew, to a great extent, at home?—In my neighbourhood I am certain he would.

1348. And then his wife and his children would benefit by that?—They would.

1349. But now, I suppose, they get little or no beer at all?—None, except they go to the public-house.

1350. Supposing the duty were taken off malt, have you considered in what way the deficiency to the revenue could be supplied?—I have this statistical fact before me, that in the last 25 years there have been taken off the Customs and Excise 20,000,000 of money, and at this moment the remaining duties produce more money than they did before the reduction began; and I believe if the

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the malt duty were served the same, in a few years we should have just as much revenue as we do now.

1351. What do you mean by their being served the same?—Swept clean off.

1352. Do you mean to say that if the malt duty were completely taken off, the duty on spirits and so forth would increase to supply the place of the malt duty?—The whole revenue of the country in some three or four years, judging from the precedents of the past, would quite recover itself.

1353. By taking off the malt duty you would at once lose nearly 7,000,000 of money; have you turned your attention to getting the revenue back by replacing that duty in some other way?—I cannot say that I have.

1354. Do you think that a tax upon beer would be preferable to a tax upon malt?—It would be infinitely preferable to the tax upon malt. It would be better financially, because the duty would be put on nearer to the point of consumption, and, therefore, the consumer would reap a slight benefit, and it would leave the producer of the barley quite free from the interference of the exciseman, and enable him to do what he liked with what he grew for his stock.

1355. In that case how would you deal with the private brewer?—I think the best way would be a license to all excepting those dwelling in houses under a certain rental. Cottagers, I think, ought to go free if it could be managed.

1356. Where the house duty commenced you think that the tax might be fairly imposed as long as the exciseman was not there to collect it?—Yes, a license would be very gladly paid by the farmers, I am sure.

1357. Mr. *Ayrton.*] Farmers do not pay the house tax, do they generally?—Not generally; I do.

1358. Sir *E. M. Buller.*] Have you turned your attention to the amount of taxation on beer?—There is no duty now upon it except the malt duty and the license.

1359. With regard to the malt duty, what is your opinion of its effect upon the price of beer?—My attention has been called to this fact, that in the reign of James I., and during the time of the Commonwealth, the average price of barley was about 18*s.* per quarter, and the retail price of the best ale was 1 *d.* per quart, and now the price of malt is about double that, and the price of beer is quadrupled.

1360. Where did you get those figures which you have just quoted?—From a pamphlet by Mr. W. R. Smee.

1361. Can you state what increase of price necessarily follows from the malt tax upon any given quantity of beer?—About one-third. If we take the figures we find that the malt duty is about one-third of the whole price of the materials of brewing, and, therefore, I imagine that it comes out at the other end at one-third the price of the beer.

1362. But supposing the duty to be taken on malt, would there not have to be added to that duty a per-centage for the profits of every person through whose hands it passes?—Unquestionably; and, besides, if the maltster makes bad debts, he makes his bad debts upon the duty, as well as upon the raw material; and if he has an accident, and cannot get the Excise to allow him for it, that loss of duty also has to be added to the price, and all is thrown upon the consumer.

1363. Taking the present price of malt to be 21*s.* 8 *d.* per quarter, you state, do you not, that that is about one-third of the price of the materials?—Yes, the price of the barley and the hops; the average price of barley is about 32 *s.*, and of hops, I suppose, 1 *s.* or 15 *d.* per lb.

1364. Supposing the price of barley to be 32 *s.*, what would be the price of the malt with the malt tax?—That is a very difficult question to answer. The retail price of malt is usually 100 per cent. upon the price of the barley; when barley is at 32 *s.*, the retail price of malt is usually 64 *s.* with us.

1365. When you say that the retail price of malt is double, what proportion of that do you put down to the malt tax, and what to the expense of malting?—Four shillings per quarter would be about the price of malting, and that would be a very full price.

1366. Then you would say that the cost price of a quarter of malt would be about 36 *s.*?—Yes.

1367. And you say the price is usually 64 *s.*?—Yes.

1368. That gives a profit of something like 22 *s.* to the maltster upon the transaction?—You have fargotten to charge the duty. But of course anything which is bought wholesale, and kept some time, and then sold by retail, is subject to a very large profit. I have been informed by people in all parts of the country, that they used to take a sack of barley to the malting, and 1 *s.*, and bring back a sack of malt, and I see no reason why that should not be the case again.

1369. Then it comes to this, that the profit of the maltster would be something like 6 *s.*?—Yes, on the retail price.

1370. And that would be 6 *s.* upon an outlay of 56 *s.*?—Yes.

1371. When you make barley into malt, there is a considerable outcast, is there not?—Yes, there is.

1372. Do you, or do you not, take anything off for that outcast?—It varies exceedingly; I have been informed by all the most respectable maltsters at Ipswich, that in some years they have a decrease rather than an increase, and that in that neighbourhood, if malt is perfectly made, the average increase is not more than three per cent.

1373. Do you think that that is the case?—I am sure that I have been correctly informed so; I imagine that there is a difference in different districts, either in the mode of drying it, or in the nature of the barley. In Yorkshire I have been told that the outcast is 10 per cent.; but at Ipswich three per cent. many respectable maltsters have assured me is their average increase.

1374. Then you do not think it worth while to take into consideration that increase in quantity from converting barley into malt?—No, it is but slight, when it is the best malt, I believe.

1375. Then, according to your statement, the profit of the maltster upon 56 *s.* is 6 *s.*?—Thirty-two shillings the barley, 4 *s.* the malting, and 22 *s.* the duty, would make it 58 *s.*, and that would make his profits 6 *s.* per quarter.

1376. Are you speaking now of the best barley?—Yes, or perhaps not that which would be used for pale ale, but the best class ordinarily used for brewing consumption; I should rather say of an average quality.

1377. Is the malt an average malt?—Yes, and made from average barley.

1378. In an ordinary year, you say, that very good

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good malting barley is obtained for 32 *s.*?—That has been the case, on the average, for the last many years.

1379. Lord *Eustace Cecil.*] Are you aware that there is a very great difference between the duty upon the best barley and the duty upon the inferior barley?—I know that there is a difference in the relative pressure of the duty.

1380. Do you think that if the duty could be in any way rendered uniform it would largely increase the price of inferior barley for malting purposes?—Not largely.

1381. But do you think that it would increase it to a certain extent?—Yes, but only slightly.

1382. Can you mention any parts of the country where feeding cattle with malt is general?—The duty perfectly forbids it now; no one could think of using it with the duty upon it; the price puts it beyond all possible use.

1383. Then you are of opinion that there is no part of the country where cattle are fed with malt?—No, except it be in a few fancy cases, but not as a system.

1384. Is cottage brewing general all over the country?—It is in Suffolk, and it is in Yorkshire; from personal knowledge I cannot speak of any other places.

1385. You have stated that it would be a great advantage to cottagers and labourers to have a repeal of the malt tax; will you state in what way?—They would buy the malt for about one-half the price that they obtain it at now, and the malt being at one-half the price, or something like that, in my opinion they would buy the malt and brew beer at home rather than go to the public-house to get their beer.

1386. Can you state any other advantages?—Incidental to that there are enormous advantages; the beer that they get at the public-houses is not genuine beer, but I believe is injurious to them both physically and morally.

1387. Do you therefore think, from your personal experience, that you would get a better day's work out of a man if you supplied him with your own beer than if he drank the public-house beer?—We should, in the long run, but I am sorry to say that very few agricultural labourers drink beer at all, excepting in special seasons of extra work, when it is allowed them; they do not usually drink beer at all; they are not able to get it.

1388. Are they not in the habit of frequenting the public-houses in your part of the country?—They go there once a week when they take their wages, or they spend their evenings there sometimes, if they are men of an idle disposition and are fond of company and beer.

1389. What do the labourers in your part of the country drink?—Tea, I think, principally.

1390. Nothing else?—Coffee, to some small extent; tea and coffee are their principal beverages, but not from choice, by any means.

1391. I presume, therefore, that the malt tax has very little effect upon them one way or the other?—It precludes them from getting beer, as I look at it, by making malt so dear that they cannot think of buying it.

1392. Mr. *Ayrton.*] Is barley much used in your district for feeding purposes?—Only the inferior class, and that is only used for fattening hogs.

1393. Do you find that the workmen work just as well without drinking beer as with drinking beer?—I think that in severe labour, especially in hot weather, they are not able to do their full work without beer.

1394. Are you aware that workmen who do the severest labour in England under great heat do not drink beer whilst they are at work in that way?—I should be very indisposed to admit that, at least those who work in the open air and who work under the sun, for that makes all the difference.

1395. Do you think that beer is strengthening to a workman?—Decidedly.

1396. Supposing you were told that in tropical climates people work under a vertical sun, and do not drink beer, and that if they did they would not be able to work at all, would that modify your opinion?—I am aware that that is the case; the hotter the climate the less strong is the stimulant that people are able and disposed to drink usually.

1397. Do not you think that harvest time, when England is hottest, is the only time when a man ought not to drink beer, if he need drink it at all?—I think that, perhaps, harvest and haymaking are the only times when there is any absolute need for it.

1398. Do not you think that workmen have the idea that beer is good for them as a stimulant owing to the farmers giving them a great quantity of beer to drink at the time of harvest?—That may be; but we are stimulated by them; there is a constant cry for beer. We can always get more work done with the beer. In fact, the men would much rather have the beer than the money when they are at severe work; that I am quite certain of.

1399. Do you think that it would be a misfortune to a workman if he were paid his wages in money, like other workmen, instead of being largely paid in beer at the time of harvest?—I do not think he would be so well able to do his severe work in a hot summer without the beer.

1400. Do you think it tends to encourage the agricultural labourers to provide for the necessities of winter by inducing them to spend their extra wages in beer at the time of harvest?—We usually find them their beer, and also pay them extra wages.

1401. Do you not then think that it would be much better for them if they had the amount in money, and were induced, so far as the farmer could induce them, to keep that money against the winter?—I do not think they would be able to go through the severe toil; I have done that kind of work myself, and I know that I found beer extremely helpful in doing it.

1402. Have you ever seen any comparison between workpeople who do not drink beer and those who do?—I have in teetotal publications, but never practically. I never knew an agricultural labourer who would not drink beer if he could get it.

1403. If in a factory where all the workpeople, inasmuch as no beer is allowed, drink water only, the greatest labour is required, do not you think the same result might be obtained in the field?—I am not by any means confident that it might not. I am an advocate for doing without such things if you can; but the taste of this country is such, that long after we are gone beer will be drunk as much as it is now.

1404. But with a view of improving the condition of agricultural labourers, do not you think it very desirable to discourage the notion of beer as a great luxury, and such a delight as to send them

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them into the public house on Saturday evenings for the enjoyment of drinking it?—I do not think so. I think an employer who set himself to work to persuade them that beer was an undesirable thing, would set himself to do an impossible thing, and he would lose his labour; he had much better set to work to endeavour to get them supplied with wholesome beer at home instead of at the public house.

1405. On the other hand, do not you think that stimulating this taste for beer by paying them largely at the time of harvest in beer tends to create the contrary impression?—It is the impression of the farmers, as well as the labourers, that beer is a necessity during those times of severe toil, so that it would be contrary to our convictions if we tried to impress the contrary.

1406. However, working-people are drinking tea now in the agricultural districts, are they not? —Yes, when they are employed upon ordinary labour, which is not at all severe.

1407. Is there not as much nourishment in drinking tea as in drinking beer?—Cobbett's favourite argument was, that if you put a hog upon tea leaves he will waste away and die, but if you put him upon malt he will get fat.

1408. But the tea leaves are not things that are eaten or drunk by the working men, are they? —No; they use the extract of it, as we do of malt.

1409. Then do you not see that that comparison which you have made would not apply?—The leaves contain of course all the virtue that you can extract out of them.

1410. Do the workmen in your county drink milk at all?—Not much.

1411. Do not they drink it with their tea and coffee?—Children use it, not men; they may drink it with their tea in a slight degree.

1412. Do they drink sugar?—I do not know whether they do or not; that is a matter of taste. I expect you would find every variety of practice with regard to the use of sugar.

1413. Is it their practice to drink tea without sugar or with sugar?—I believe it is with them as it is with the middle class, it is a matter of individual taste.

1414. But with regard to nutrition, is there not as much nourishment in milk and sugar as there is in the extract from malt?—I should think probably there would be.

1415. And perhaps a great deal more?—But there would not be the same stimulant.

1416. If it is nourishment without stimulant, it is, therefore, better for health, is it not?—I should not be disposed to admit that it was better for health; but it is a matter of theory.

1417. Major *Parker.*] When you say that the labourers brew 18 or 20 gallons out of their malt, do they brew their beer all of one quality?——They usually reserve a small vessel of the first wort to drink in the latter part of the day, when they are a little pushed.

1418. From your own personal knowledge, as a farmer, are you aware that they not unfrequently begin the day with the mildest beer, reserving the stronger quality as the burden of the day and exhaustion presses on them?—That is the usual custom, I believe.

1419. When you, in common with other farmers, deprecate the going to a public-house by the labourers, what is your opinion as to the necessity of their having a fair supply of beer of their own whilst they are labouring in the field?—I am decidedly of opinion that they are the better in health for having a reasonable supply of pure beer; they are more able to do their work, and they do it with more comfort.

1420. Do they not take their beer with them into the fields and drink it as they need it?—Yes; always when we allow them malt.

1421. I think you stated that you have not tried the experiment of feeding cattle with malt, under any circumstances?—I have not.

1422. Did you ever use malt combs for your sheep?—I have not used them.

1423. Are they used in your neighbourhood? —They are extensively used to mix with other matters.

1424. What value do you attach to the malt combs that arise from a quarter of malt?—I am not able to answer that question.

1425. Mr. *Surtees.*] Does not the difference in the increase in the quantity of malt made from a quarter of barley often depend upon the weather being fine or wet about harvest time?—I imagine it does; but I am told that in some years the increase is much larger than in other years, and in some neighbourhoods it is larger than in others.

1426. Mr. *Read.*] Why do you give your men malt at hay time and harvest?—We think that they are not able to go through the hard work in the hot summer unless they have beer to drink.

1427. Do you think that it answers your purpose to give them malt?—We are quite convinced of it.

1428. And that you could not get the same amount of work done, even if you paid that value in money?—I do not think we could, neither would they be willing to take it in that way, as far as my experience goes.

1429. You do not give them beer as well as malt; you give them malt in lieu of beer, do you not?—We give them malt in lieu of beer. Sometimes, when they are engaged on any extra hard work, we carry them out our own beer, but they are supposed to depend upon the beer which they brew from the malt which we give them; and they prefer that to money, because they are unable to buy pure beer with their own money.

1430. What is the quantity of malt that you allow your men at harvest?—Three bushels are allowed, that is the universal custom in my neighbourhood.

1431. What do you allow them at hay making? —From half-a-bushel to a bushel, according to whether they have much or less to do.

1432. Mr. *Ayrton.*] How does it happen that three bushels of malt are returned as worth 27 *s.* upon the statement of wages paid in Suffolk?—That would be the average price, I imagine; we can buy it at 9 *s.* a bushel, usually, and indeed less than that, between 8 *s.* and 9 *s.*

1433. Mr. *Read.*] I presume, if you had malt comparatively cheap, say about 5 *s* a bushel, you would fancy that the purity of the beer sold would be increased?—Very enormously I imagine. We saw in the instance of the Crimean war that, as soon as the duty was increased, the consumption of malt was diminished; and there was no reason to suppose that anything in the condition of the country would lead, at that time, to a less consumption of beer; therefore, the fair argument is, that the beer was made from a less amount of malt.

1434. Mr. *Dent.*] Have you any authority for saying that the consumptions of beer was not decreased

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decreased owing to the increase in the price of malt?—The retail price of beer was not altered, so there was nothing to make it decrease. Besides it is a statistical fact that the consumption of beer is constantly increasing, but I have not the statistics of that year, and therefore, perhaps, I must abandon that argument.

1435. Mr. *More.*] Have you ever fed cattle on malt?—I have not.

1436. Have you entered into the subject of malt for feeding purposes in your essay?—Yes, and I collected all the evidence that I could upon the subject.

1437. Have you tested the relative merits of beer and tea for labouring men?—I have not.

1438. You wish us to consider you in the character of a successful writer upon the subject, rather than as a practical authority?—The information which I possess is mostly derived from reading and inquiry rather than from actual observation.

1439. I presume that a clever man may write a very successful treatise upon a subject without having a practical knowledge of it?—I think he may; his knowledge may be as certain which he derives from information as from the actual doing of the thing.

1440. Mr. *Hardcastle.*] Did I rightly understand you to say, that in your belief the diminution in the consumption of beer during the Crimean war arose from the increased adulteration on the part of publicans?—I cannot say on the part of whom, but I take it as I have stated. We had no reason then to suppose that the consumption of beer should be reduced; the country was as prosperous as usual, the retail price of beer was unchanged, and yet we find that the consumption of malt was very largely reduced, and therefore the fair inference is, that there was adulteration, and that the same amount of beer was made from a less amount of malt.

1441. Do not you think that it had anything to do with the attempt which was made at that time by brewers and publicans to raise the price of beer?—I think not. The retail price of beer was not altered, and it is by retail that the great bulk of the beer is consumed.

1442. You told us a story about the custom of taking a sack of barley and 1 *s.* to the malt-house, and bringing back a sack of malt?—Yes; that has puzzled me more than anything I have come across in my investigations. I have a man in my parish whose father did that since this century has come in, and yet the duty had been on long before then; but I have met with that statement from such a number of authorities, that I am certain the practice did exist; and I have been told that at one time the duty was only charged upon that malt which was used for public brewing, and I think that is how it is to be accounted for. I imagine that the malt was not so perfectly freed from its refuse as it usually is now, or else they could not even so have done it for 1 *s.*

1443. It was 1 *s.* then instead of 10 *s.* as now?—I have supposed 8 *s.* I think anyone inquiring into that matter can arrive at no other conclusion than that it was habitually done. I have heard of it in so many quarters.

1444. Mr. *Dent.*] I rather gather that you do not think much of Mr. Lawes' report about the use of malt for feeding cattle?—I do not, for I have met with sufficient practical and uncontroverted testimony to its value that I am certain no experiment could prove to the contrary.

1445. Yet, Mr. Lawes is a gentleman who does not write without practical experience?—I am told that his figures are eminently trustworthy.

1446. As an agriculturalist you have had a great deal of experience, but Mr. Lawes' experience is probably greater than yours, for he is the most valuable writer on agriculture that we have, who adds the most careful observation of facts to the most careful recording of facts?—I have quite heard that of Mr. Lawes.

1447. And he writes from thorough practical experience?—I have quite that opinion of him.

1448. His experiments were carried out on 20 milch cows, 20 oxen, 60 sheep, and 48 pigs, and therefore more likely to be trustworthy than experiments carried on upon a small scale?—I believe he gave but a very small proportion of malt, therefore you could not say whether it was the malt, or the barley, or what.

1449. Are you aware that these were not the first experiments which he carried out in the use of malt?—I think they were the first.

1450. The last experiments were for a special purpose, but I think you will find from his report that he had made use of malt in some former very valuable experiments on feeding stock?—I am not aware of that.

1451. Do many of your cottagers keep cows?—None of them.

1452. Do the farmers sell milk?—Yes; but ours is not at all a dairy neighbourhood, there is considerable difficulty in obtaining milk.

1453. Is there a great scarcity of milk for the labourers?—Yes.

1454. Do you employ many Irish labourers?—No, they never come to our neighbourhood.

1455. Do you not know that in harvest time they drink a great deal of buttermilk?—They would not get it in our district.

1456. You said that you judged of the impurity of the publicans' beer from your labourers after their club feasts having a headache and not being fit for work?—Yes, I regard that as one practical proof.

1457. Did you ever hear of anything of that kind after a Greenwich dinner?—I am not in the way of gentlemen who go to those dinners.

1458. You stated you thought that if you did away with the malt tax the natural increment o the revenue would very soon make up for the abolition of 7,000,000 *l.* of revenue?—There i not a doubt of it. Mr. Cobden was of the same opinion.

1459. If you are to do away with the malt ta how would you deal with the duty on spirits what is to become of that?—Spirits, I am aware would then stand to a certain extent in an unequal position, but in this country spirits are no a common article, and they are not a necessar article of drink; they do not enter our daily die in the way that beer does.

1460. Judging by the enormous quantity o spirits imported and the quantity of spirits distilled in Ireland and Scotland, one would almos imagine that they were as necessary as beer?—But they are used medicinally, one takes a glas at night before going to bed, but not to work on you never see a man carry spirits to the field, an it would be most undesirable that he should d so. Since the imposition of the malt duty th consumption of the beer in Scotland has enormously decreased, and the consumption of spirit increased.

1461. But when you do away with the duty o

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malt, of course you cannot imagine that the distillers in Ireland and the distillers in Scotland will be content to have the very high duties which they have now?—I have never heard that they have objected to the malt duty being dealt with.

1462. Most likely not, because they hoped that if the malt duty is done away with they will have, of course, the greater claim to have the duty on spirits lowered; therefore, if you are to lower the duty on spirits, remembering how much customs and excise duty you derive from spirits, where is this increment of revenue to come from?—I know that there is a difficulty in that respect which one would wish to admit.

1463. You presume that in the case of labourers and men in the middle class of life who now drink a great deal of beer; beer may, perhaps, to some extent, replace tea and coffee at breakfast, so as to go back to the good old habits of our ancestors as you would call them?—Yes.

1464. Then you would have a less importation of tea, a less importation of sugar, and a less importation of coffee?—I do not think it would be so; the beer which they drink would cost so much less money that they would be able to use more.

1465. With regard to the beer tax, you stated that you would let all houses below a certain value go free so as to encourage cottagers brewing?—I have not studied that question, but it is so advantageous to the morals of the lower classes that they should brew at home, that I think that a matter of revenue ought not to come in the way if we could foster it.

1466. Do you know anything of the habits and homes of the working classes in towns from practical experience?—I do not think there is any home brewing in the town of Ipswich.

1467. Do you know what is the case in large towns?—In the Yorkshire towns they do brew in the cottages.

1468. Do you think there would be accommodation for brewing in the ordinary cottages in London and in the manufacturing towns?—Yes; but I do not think the practice would be adopted.

1469. Would not the abolition be rather in favour of the agricultural labourer as against the town labourer?—It would benefit the agricultural labourer more than the town labourer, but it would also benefit the town labourer; it would cheapen his malt and his beer.

1470. But he buys his beer from the public-house?—It would cheapen and purify that.

1471. If you are going to take the tax off malt, which everyone who uses beer pays, you must put it on something else to make up for this loss of 7,000,000 *l.* of revenue, because I think you see yourself that the natural increment of the revenue would scarcely cover the loss of 7,000,000 *l.*?—It would be some few years perhaps before it would do so.

1472. That money must go somewhere, and therefore you are proposing to give the agricultural labourer the benefit at some one else's cost?—Yes, he would reap the largest share of the benefit no doubt. If it could be done so that the farmer paid for his labourer, I think that they will be well satisfied, but the quantity I imagine which is used by the agricultural classes would not be a very large quantity as compared with the whole consumption of the country.

1473. Mr. *Cave.*] You stated, did you not, that if malt were cheaper beer would become purer?—No doubt of it.

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1474. Do you refer to public-house beer as well as cottage beer?—Yes.

1475. Would there not be the same incentive for a man to go to a public-house that there is now?—I think a man would keep his beer at home, and so would be prevented from going to a public-house.

1476. Is not one incentive to going to a public house a comfortable room and society, and all that sort of thing?—Yes, I think it is.

1477. Do you think that the habits of men would be changed simply by the quality of beer, particularly if the beer was better at the public-house also?—I think they would be less injured if they drank pure beer, and they would take less of it, because the adulterations practised by publicans are practised with two objects; one is to intoxicate, and the other is to create artificial thirst.

1478. Are you of opinion that brewing at home would be sufficient to keep people out of the public-house altogether?—It would not keep all out unquestionably, but a large class of our steadiest men would much rather drink their beer at home, and I think in a little while they would scarcely ever visit the public-house.

1479. At most public-houses beer can be obtained that people can take away and drink off the premises, can it not?—Yes; but I think it is not so to any extent among village people.

1480. But a steady man who did not want to go to the public-house has now an opportunity of buying his beer and drinking it at home?—He could do so.

1481. Does he do it to any great extent?—I never knew that done at all.

1482. Supposing malt were cheaper, and beer could be brewed at home, and also would be better than the public-house beer, what would be the change of circumstances which would induce such a change of habits. I want your opinion upon that point, if you have considered it?—I think, malt being cheaper, a man would buy his bushel or half-a-bushel of malt, and having beer in his own house he would very often pass the public-house without going in, when now he is tempted by the want of beer to go in.

1483. Would the people of the public-house from this brewing in a large quantity be able to brew much cheaper than a man could at home with a small quantity?—It costs nothing practically to brew at home; that is to say, it is done in over-time, or the woman does it, so as to lose nothing of labour, and the firing generally on a farm is a perquisite, and then they have the grains remaining besides.

1484. Is that part of the county from which you come one in which fuel is cheap and abundant?—Yes; almost all our men have a certain quantity as a perquisite; for instance, in cutting down a fence they have a certain portion which they carry home with them.

1485. Is it not the case that in some parts of the country it is almost impossible for a cottager to get fuel enough even to cook his victuals properly?—I never was in such a part of the country, to my knowledge.

1486. At the same time you can imagine that in many of the midland counties, where wood is scarce and where they are a long way from the coal-pits, fuel would be dearer than where you are?—It would, but I think in that case the grains would more than pay for the fuel.

1487. Then your opinion generally is, that a cottager

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cottager could brew at as cheap a rate as a publican, taking everything into consideration?—It would literally cost him nothing.

1488. Do you know whether tea and coffee are cheaper than beer as the diet of a working man; have you ever studied that?—I have, to some extent, though I have never regarded it as a very important element in the question; but I believe beer, with the malt free of duty, would be about the cheapest thing a man could drink, next to water.

1489. Have not you considered whether at present beer is dearer or cheaper than tea or coffee as diet; I mean beer as the cottager gets it now?—It would be much dearer than tea or coffee; it is enormously dearer.

1490. You have been asked with regard to the amount of nourishment in beer; have you heard of stokers in steamers leaving off the use of beer and spirits and taking to water as being better for their health?—No, I have not; they work in great heat.

1491. If you heard that they found it better to do altogether without fermented liquors, would you suppose that that would equally apply to agricultural labourers?—I do not think it would; the artificial heat in which they work is a different thing to direct exposure to the sun; there is something in that which makes water dangerous to drink.

1492. Is it not the case that the effect of heat, whether artificial or whether that of the sun, is simply to produce great perspiration?—And something besides that, because a hot sun will produce sunstroke.

1493. Sunstroke is not produced by diet, it is the direct action of the sun?—I have several times known men ill from drinking cold spring water when working in the sun, when I imagine they would have drunk it with impunity had they been in the shade.

1494. Mr. *Ayrton.*] You mean from the cold water chilling the stomach?—Yes.

1495. Are you not aware that beer is still more injurious in the heat of the sun than it is in artificial heat?—When you get to a certain extent of the sun's heat, I suppose it is.

1496. Mr. *Cave.*] Have you not heard of cholera, even, being produced by cold beer being drunk by labourers in the sun?—No; on the contrary, I understand that beer drinkers were very exempt from cholera, and water has appeared to me to be a great cause of cholera.

1497. Have you ever heard of people shooting and undergoing hard labour in that way on the moors, and drinking nothing but cold tea?—Yes.

1498. That would therefore be a case in point, would it not?—It would; but the labour of walking and shooting is not nearly so severe as the labour in harvest time.

1499. Do you know whether in the cyder counties more work is got out of a labourer than in the beer counties?—I do not; I have not studied that point.

1500. Have you ever heard of labourers having tea or coffee given to them instead of beer for their satisfaction?—I never knew a case of it; our men would not submit to it.

1501. You have heard, I dare say, of coffee being served out on board ship, sometimes instead of rum, as rations, and that it has been proved that the work is done better?—Yes.

1502. You probably would agree that even beer would be better than rum?—Yes, far better; and if they could do without beer, they would do well to go without it. I think those who do not tax their physical powers are best without anything of the kind.

1503. You have been asked, have you not, something about the effect of the Act for levying the duty by weight upon malt?—Yes, as far as that Act went it was a benefit to the farmer; it tended to equalise the pressure of the duty, but that tendency was to an exceedingly small extent.

1504. When you say that it tended to equalise the pressure of the duty, do you mean that it brought down the price of best barley, and raised the price of the lower description of barley?—I do not think that, practically, there has been any appreciable difference in price; but as a matter of theory, one could see that its tendency was to lessen the difference; and I should suppose that it would so by elevating the lower priced barley.

1505. When you say that it equalised the price, it must have done so either by raising the one or lowering the other?—I do not think that any one going into a market could tell you that there is any less difference now than formerly, in consequence of the Act.

1506. It was one of the causes of complaint was it not, that the inferior qualities of barley were much increased, and therefore paid a higher duty in proportion?—It was.

1507. That has been entirely done away with by this Act, I presume?—Not entirely, by any means, because some of the highest barleys are not the heaviest barleys.

1508. Then the difference in price was not caused solely by the duty being levied upon quality rather than upon weight?—Only partially so. I am of opinion that it was only to a comparatively limited extent.

1509. Then you think that the operation of that Act has been so small as not to have made much difference?—That is quite my opinion.

1510. Has it increased the malting from foreign barley, do you know?—I do not know.

1511. Do you know anything about malting from foreign barley?—No, not practically.

1512. *Chairman.*] You stated, did you not, that this Malt by Weight Act did not raise the price of the inferior classes of barley?—I do not think that it made an appreciable difference.

1513. You do not know to what extent that practice has been applied?—I do not. I know that it has been tried, and I have heard some of our maltsters say that they should go to work under it, but I do not know to what extent it has been adopted.

1514. Are you aware that the quantity of malt made last year was from 45,000,000 to 50,000,000 bushels?—Yes.

1515. But you do not know the quantity which was made under this Act?—No, I do not. The maltsters told me that the extent to which they used it would depend a good deal upon the season, because some years they find the barley much heavier than others, and so it would be a matter of calculation as to whether it would be better to pay the duty by measure or to pay it by weight.

1516. Do you know whether the heaviest barleys are generally grown upon the lighter lands or upon the heaviest lands?—A mixed soil would grow the heaviest barley, I should think. I do not know exactly, but I should think there would not be much difference between the light and the heavy.

1517. Have you any experience of barley grown upon heavy land?—No, not purely heavy land; I have upon a heavy mixed soil, but not purely heavy.

1518. Sir *Edward M. Buller.*] You stated, did you not, that the three bushels of malt which you give to your labourers was worth 27 *s.*?—Usually, I think, it would be 26 *s.* perhaps.

1519. Do you give them the malt at precisely the same price at which you get it from the malster?—Yes, we give them three bushels of the best malt, whatever may be its price. We make a point to get it of the best.

1520. If the price is 27 *s.*, that is materially higher than the price which you have given us as the average price which you stated it to be in 1864?—I did not give that price; it arose from one of the honourable Members' question. We shall have to pay perhaps nearer 30 *s.* this year; and 10 *s.* a bushel is, I believe, the current price of malt now. On the average, I think the retail price of malt is about double the wholesale price of barley.

1521. If the price of barley is 4 *s.*, and 6 *d.* is the price of converting it into malt, and 2 *s.* 9 *d.* is the duty, the cost price of a bushel of malt would be 7 *s.* 3 *d.*?—It would.

1522. And supposing it were sold at 9 *s.*, that would leave 1 *s.* 9 *d.* profit?—Yes.

1523. That 1 *s.* 9 *d.*, if you multiply it by 8, would be 14 *s.*; that is to say, the profit would be 14 *s.* a quarter, which would be 20 per cent.?—Yes; but when barley is at 4 *s.* per bushel, malt is not worth 9 *s.* Still it is undoubtedly the fact, which I think any maltster would admit, that his profit upon what he sold by retail was a very heavy profit; the trade is in very few hands, and they sell comparatively a small quantity in that way, and therefore they get well paid for it.

1524. Supposing the profit upon the whole outlay, that is to say, upon the malt and the expense of malting, and the duty, to be 20 per cent., it would be fair, would it not, to charge 20 per cent. for that which is invested in the duty as well as that which is invested in the materials?—It would.

1525. And therefore to the consumer the price of the malt would be enhanced by that 20 per cent. upon the duty?—Yes, it would.

1526. And therefore the operation of the duty in its effect upon the purchaser of malt would be to increase the pressure of taxation 20 per cent.?—Yes, it would increase it by the duty and increase it by 20 per cent. upon the duty; that is to say, to the retail purchaser. I imagine that the wholesale price is very different.

1527. Mr. *Ayrton.*] Will you make a comparison between wholesale and wholesale and not between wholesale and retail, because that rather leads to an erroneous conclusion; will you tell us what is the wholesale price of barley and what is the wholesale price of malt?—I do not know what the wholesale price is. In the question which we have been rather aiming at now, namely, cottage brewing, it is the retail price alone which we are concerned with. A poor man can buy barley at the wholesale price of the farmer, but he cannot buy malt except by sending to the maltster, and he can only buy it by submitting to those very heavy conditions.

1528. But that is not a question, is it, which is in any way connected with the duty?—Entirely so; if it were not for the duty the labourer would buy his barley of the farmer, and carry it to the maltster and exchange it for malt. There would be small maltings, as there used to be in olden times; small maltings in small hands were far more numerous in this country than they now are.

1529. All that you have told us is based upon those speculative opinions that the character of the malt trade would be changed, and the character and relation of the labourer would be also changed?—The malt trade has changed in consequence of the duty; it has passed from a number of comparatively small hands into the hands of a few large men, and it is a necessary inference that, if the duty were repealed, it would pass back again to some extent.

1530. Why do you think that that is in consequence of the duty; all the handloom weavers have been shut up in Lancashire, and great manufactories have been established instead, without any question of duty being the cause of it; do not you think that precisely the same operation might be taking place in agricultural districts, that a number of small people have given way to those who can deal on a large scale?—In the case that you refer to, there was introduced the element of cheaper power, namely, steam power to drive the looms, rather than manual power; but with regard to the malt trade, a maltster is obliged to find a bond of a certain value; and in the case of a small man who would be disposed to go into the trade, he would probably not be able to get a bond, and therefore he is shut out of the trade now.

1531. But is there not superior economy in carrying on a large process, with greater facilities and convenience?—There is no doubt a superiority of economy to the manufacturer, but the retail consumer does not get his share of that superiority; he is obliged to buy at the manufacturer's price, and a manufacturer selling only in little quantities will have his price, and the other man is helpless.

1532. Can you give us a comparison between the wholesale price of barley and the wholesale price of malt from the same sort of barley?—I cannot; we have nothing to do with the wholesale price of malt; that usually, I imagine, is a matter of private arrangement between the brewer and the maltster, which never comes to the public ears.

1533. Is barley used at all as an article of food by the peasantry in your county?—No; they would not touch anything that had it in it if they knew it.

1534. Why not?—It is prejudice, and nothing else.

1535. Would you like to return to the old system of eating barley?—I should have no objection to do so on a limited scale, if it were mixed with flour, but wheat flour relatively to barley is vastly cheaper now than it used to be.

1536. And that is the reason why you think they have discontinued using it as an article of food?—I suppose it has been discontinued for generations; I have not heard of its being practised in my time.

1537. Major *Parker.*] Among the advantages which you have enumerated as arising to the labourer by brewing at home, you have said that he gets a better quality of beer, and also the advantage that he gets the grains, but you omitted to say anything about the yeast?—I did; I should have said that he gets the yeast in addition

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tion to the grains to help him to pay for his firing; that is perfectly true.

1538. He generally bakes at home, does he not?—Yes, he does, and therefore yeast to him is a necessary article.

1539. Allusion has been made to the fact that the labourer could get beer from the public-house and carry it to his home to drink?—Yes, but I never knew that done.

1540. Would it not be considered a very great hardship to a labourer or to the other members of his family were he to have to send to the public-house daily for his supply of beer?—I think it would be an exceedingly unwholesome thing to send his children to the public-house at all.

1541. And it would necessarily entail a loss of time on whoever daily went on this errand?—It would, of course, in villages, where usually the population is very scattered from the centre.

1542. Mr. *Ayrton.*] Have you any idea of the strength of the beer that is brewed by the labourer?—We might take 18 gallons to the bushel as the average strength; they usually would reserve a small barrel of the best wort for special emergencies, for use in the later part of the day, and they would make the other very weak, so that they could use it very freely as a beverage.

1543. Does a farmer, when he brews for the labourer, brew 100 gallons out of five bushels of malt?—I should think that the farmers usually brew about an average of 18 gallons out of a bushel.

1544. Mr. *Read.*] When you say that, generally speaking, the price of malt is double the price of barley, you do not mean to include years like this?—No; I mean the average retail price; I especially named the retail price; the wholesale price is not so.

1545. You stated that the price of barley at 4*s.* a bushel would give malt at 64*s.* a quarter?—Yes.

1546. Of course you do not mean that the price of barley this year is 6*s.* a bushel, whilst that of malt is 96*s.* a quarter?—No.

1547. If barley is 6*s.* a bushel, it would not be 96*s.* per quarter for malt?—No.

1548. What do the labourers generally go to public-houses for?—I think beer is the largest inducement.

1549. If they had cheerful society and tea there, would they go to public houses?—I do not think that they would.

1550. Have you ever known that tried?—No, I have not.

1551. Do you apprehend that it costs more for firing to brew a gallon of tea than a gallon of beer?—I should think in winter time the firing for the tea costs nothing, because they are obliged to maintain a fire; but, in the summer time, the firing for the tea would cost the most, because the fire has to be made on purpose.

1552. I think you stated to the Committee that very often the inferior grinding barley, which is sold for feeding purposes, weighs quite as much as the best barley?—Not quite so much, but the difference is not very great.

1553. So that in fact the weight has not very much to do with the quality of malting barley?—It is not by any means the sole criterion or the most essential one.

1554. What do you pay directly as a farmer to the malt duty?—On that question, taking the figures of Sir Robert Peel, the average amount paid by farmers in this country directly on the malt they consume is equal to a property tax of 14½*d.* in the pound.

1555. Mr. *Ayrton.*] How does the farmer pay; he does not consume the malt, does he?—He buys it and gives it to his men.

1556. If the duty were remitted, the duty ought to be remitted, ought it not, to the workman, and not to the farmer?—If the malt was allowed by the farmer, of course it would fall to his share.

1557. Therefore the farmer has no interest in the matter, if he acts fairly towards his workman, by remitting to him, as he ought to do, the whole of his duty?—In that case the workman would get a larger quantity of malt.

1558. Therefore if that be the case, there is no tax at all upon the farmer?—I do not think that would be the case, because we have to allow a certain quantity of malt, whatever be its price, and no more would be necessary at those special times, if there was no duty, and we should be benefited by that reduction.

1559. If the Legislature remitted the duty, it would be for the benefit of the consumer, and not for the intermediate agent, in transferring it from one hand to the other?—The duty now is not upon beer, the duty is upon malt, and the benefit of its remission would fall to the consumer of malt, and as the farmer is a large consumer of malt he would reap this benefit.

1560. A farmer is not a larger consumer of malt, is he, than any other member of society?—He is in his business, although he is not individually and personally.

1561. Is not that as the result of trucking his wages instead of paying his men in cash?—I do not think it would be possible to have the cash system wholly.

1562. If the Legislature remitted the duty, would not it be to the interest of the farmer to give his workmen more malt and not money in wages?—He would, not at haytime and harvest, probably allow more, because the amount allowed now is proportionate to the amount of work done; but probably he would allow malt at other times of the year; but that of course is entirely a matter of conjecture.

1563. Still, if the Legislature remitted the duty, and the farmer were to remain as the intermediate agent to give over the malt to the workman, would it not be an abstraction of the workman's right if the duty were not paid over to him in money in addition to the malt?—I think that the farmer would be entitled to gain upon that measure which he now has to find, whatever be its price. He has borne the burden on that proportion during past years, and he would be entitled to that remittance; but the workman would largely benefit by being able himself to get malt at a reduced price, and his master would be disposed to give him more, owing to its being cheaper.

1564. In either case the workman would get the benefit of all the workman consumed, and the only gain to the farmer would be that which he consumed in his own family, like the workman?—That would not be the case, you will see, because in harvest time I allow my men three bushels of malt*; it has always been the custom to do so, whatever has been the price; and if the price is reduced by the amount of the duty, I shall have less money to spend to find that quantity.

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1565. Do not you think that would be one of the reasons, if not the strongest one, for the farmer, or the farmer's agent, to put the money into his own pocket, instead of into the labourer's?—I think the farmer is entitled to put it into his own pocket; he has to bear now a cost which no other class of manufacturers or professional men bear.

1566. Mr. *Dent.*] That is always assuming that he pays a large proportion of wages in beer?—Yes.

1567. Supposing that he has a teetotaller amongst his men, who says, I do not want the malt, but I want to supply myself with milk or tea; what would you do in that case?—We should allow the man the money which we have to pay for the malt to the other men; I have never known a case of a teetotaller, but I have known a man in an unsettled state, so that he had nowhere to keep his beer, and he has asked me to pay him money instead of malt.

1568. If the malt tax were reduced, how would you pay that man?—He would only get what the malt cost.

1569. Then it would be so much in deduction of that man's wages to that amount?—It would be so, as compared with now.

1570. Because he has that money to spend in other purposes instead of malt?—Yes, but for the purpose for which it is given it would be equivalent to the more money that he has now; it would not be a reduction of his wages.

1571. He does not spend it in malt; the man declines to take the malt, and says, "Give me the money," and he wants to spend that money on other things; therefore it could not possibly be an equivalent to the reduction of the malt duty, and must be a dead loss to him?—You are right in such a case, but you would have to go a long way to find such a man.

1572. Sir *E. M. Buller.*] When you are in the habit of giving a man 27 *s.*, he would not be very well content to take 13 *s.* 6 *d.* less, the cost of malting, which is exactly the same case?—I never met with but one man who preferred to take money, and that was from peculiar circumstances.

1573. Mr. *Ayrton.*] You propose to give a man 13 *s.* 6 *d.*, if this Act is passed, and put the other 11 *s.* 6 *d.* into your own pocket?—Yes, it is unjustly put upon us now, and we should profit by the reduction, we hope.

1574. Sir *E. M. Buller.*] The maltster might grow his own barley, and if the barley is worth 4 *s.*, he could malt it at 6 *d.*, and he could afford to sell it to his labourer at 4 *s.* 6 *d.*?—Yes.

1575. You say that to the man who did not take malt, you would pay money value of the three bushels of malt, which would be 13 *s.* 6 *d.* according to that calculation?—Yes.

1576. You have been in the habit of paying to that very same man 27 *s.*, that being the value of his three bushels of malt?—Yes.

1577. If, when he came to you to be paid, instead of giving him 27 *s.* you gave him 13 *s.* 6 *d.*, do you think he would be satisfied with it?—I believe you extremely rarely meet with men who would not take the malt.

1578. But my question had reference to the man who did not take the malt?—I think that when the object is that the man should be provided with the necessary drink through that period, it does not matter whether he can get that drink for 1 *d.*, or 6 *d.*, or 6 *l.*; it is all one to him; the drink is all he wants.

1579. Mr. *Ayrton.*] Do you think that agricultural labourers are so simple, that when it came to their knowledge that by the alteration in the duty they were receiving as an equivalent for 27 *s.* now, only 13 *s.* 6 d., they would take no heed to the other 13 *s.* 6 *d.*, and would be quite content; do you think that they would not probably get to rick burning as an alternative, with the view of impressing upon you a sense of justice in these matters?—I think they would see that we have borne a heavy burden for a long time, and that we are entitled to relief; and they would reap a large benefit in getting the malt themselves, and the beer purer and cheaper in the general course of things.

1580. Mr. *Read.*] Do you suppose that if there were a great reduction in the value of malt, in all probability it would be shared equally by the producer (the farmer), and by the consumer (his labourer)?—I think it would, as both parties would reap the benefit, the producer and the consumer.

1581. Neither the producer nor the consumer would get the whole of the benefit?—Decidedly not.

Mr. JOHN CLAYDEN, called in; and Examined.

Mr. *J. Clayden.*

1582. *Chairman.*] YOU live in Essex, do you not?—Yes; on the borders of Cambridgeshire.

1583. What towns are near where you live?—Saffron Walden and Bishop's Stortford are our malting towns.

1584. What quantity of land do you farm?—I farm between 1,800 and 1,900 acres of land.

1585. How much of that is your own land?—About 750 acres.

1586. The rest is rented?—Yes; I rent 1,000 acres from Lord Braybrooke and the rest from other owners.

1587. Have you any other occupation besides that?—None.

1588. Is that a great barley district?—Where I reside it is generally a great barley district; but some of our land is more suitable for it than other descriptions of land are.

1589. Do you consider that Essex grows as good barley as any other county in England?—The part of Essex which I reside in, on the borders of Cambridgeshire and Suffolk, does, but not the further sides of the county; the rothings of Essex and the hundreds of Essex do not grow barley; they are more wheat growing districts.

1590. Perhaps you would say that Norfolk and Suffolk are more barley counties than Essex?—I think I should as a whole; but still Essex is a large barley producing district.

1591. But the Eastern Counties, taking them altogether, are the great barley counties of England?—They are.

1592. Do you farm on the four-course system?—Yes, on the light descriptions of land we farm on the alternate shift, with one crop and one green crop, or something of that sort.

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1593. How much of your 1,900 acres is barley land?—I should think 1,000 acres of it.

1594. Can you grow on that land the best barley?—Generally speaking, we do; it depends of course upon the season and the modes of farming.

1595. As a rule, do you grow any inferior barley at all?—Yes.

1596. Do you mean damaged by the weather, or on account of the land?—The weather would depend upon the seasons; but there is certain land which does not produce anything like the quality of barley which other descriptions of soil do.

1597. You heard from Mr. Randall that they farmed in Worcestershire on the six-course system; do you farm in Essex upon that system?—It is pretty nearly on one and the same system on my own heavy land.

1598. What effect do you think the malt tax has upon the best class of barley?—There is less sale for it, but not in consequence of the malt tax, nor does the malt tax operate unfavourably to the price of the best barley only in this way, that the malt is always saleable for pale ale; but if we had a repeal of the malt tax we should have other sorts of barley still competing with it, and malt would be made from the lower descriptions of barley.

1599. Supposing the malt tax were taken off, do you think that the best class of barley would keep its price, and even be at a higher price than it is now?—I do not suppose it would be higher, for this reason, that there would be a greater demand, and beer would be made of a poorer quality, generally speaking, but I think that barley would be found for it.

1600. The last witness told us that he felt certain that the repeal of the malt tax would increase the price of the best barley; is that your opinion, or is it not?—I think it would improve the demand for our barley generally, but as to the price, that must depend, of course, upon the supply and demand, and the crop of a season, and its quality.

1601. Is it your opinion that it would improve the price of the inferior barley?—It would act upon the inferior barley in this way, that we should use it in a certain state for our cattle, which we now cannot do. You asked the last witness the question, and he answered that we could use grown barley for our cattle; he also told you that the grain picked up in the stubbles is injurious to the sheep, as so it is, for it injures them very much in the form of dry barley; but when that barley has sprouted in the field, or is saccharised in an outhouse, and given to the cattle, it forms a very beneficial food. We were formerly allowed to do that, but we are now entirely prevented from doing it. I hold in my hand a notice from the Board of Inland Revenue, which stopped the sprouting of barley which was used in our neighbourhood to a great extent, which barley was used for feeding cattle.

1602. Mr. *Ayrton.*] What is the date of the notice?—One thousand eight hundred and sixty-five.

1603. *Chairman.*] Do you find much difficulty in selling your inferior barley?—There is a difficulty of course, because the demand is confined to feeding and grinding purposes.

1604. We have heard a great deal of the different classes of barley; I want you to draw as well as you can a distinction between malting barleys and grinding barleys, and taking those years in which the price was very high, down to what price did the lowest malting barley go?—The price this year of barley ranges very high, and very low in consequence of the excessively wet season. The barley which was secured early, of course, found a very ready market. Then we had a second quality of barley, which commanded a fair price, in consequence of the price of the better class being enhanced; and then we come to a description of barley which would not bear the duty at all.

1605. Was the last witness correct in stating that malting barleys varied from 40 *s.* up to 55 *s.* and 56 *s.*?—I believe in exceptional cases the price of 55 *s.* and 56 *s.* was touched; but the general price of the highest barley was from 50 *s.* to 52 *s.* and 53 *s.* Then we had a second quality of barley at 42 *s.*, and then another description down as low as 24 *s.*

1606. What was the lowest point touched for malting barley?—I think that is impossible to say, because the lower descriptions of barley for the pale malt and ale brewers would not bear a high duty; but they would be made into another quality of malt, namely, brown malt, and there would be an increase in the use of that quality, because it is browned up and dried very high. Those barleys were adopted for that purpose; but they were of no use whatever for the makers of ale.

1607. But I want to know whether last year barley at 34 *s.* or 35 *s.* was sold for malting?—I have no doubt there was for brown malt, and even below that, I should say.

1608. Supposing the duty was taken off malt, would the barley that was sold at 34 *s.* or 35 *s.* approach nearer in price to the highest class of barley?—I should imagine that it would be so, rather, because it would have no duty upon it; therefore, it would be used by parties, where probably it is not used at all, the reduction of price being so great.

1609. Is it your opinion that that which is now called grinding barley would be used at all as malting barley?—Grinding barley would be used in the manner in which people in former times used it, namely, in the saccharisation of it for our stock. You must be aware that the lower descriptions of barley are always used when the seed-time comes. A farmer growing 40 or 50 acres of inferior barley would lay that barley on one side until the seed time comes. It would be equally good for germinating in the ground, but it is not so good for malting.

1610. You must always have that, of course?—Yes, you would endeavour to reserve a portion of it.

1611. With regard to the rotation of crops, as you farm both heavy and light land, do you think that the malt tax interferes with its proper rotation?—I feel sure that it does on the heavy land; it is not so on the light land, because it is always grown on the four course system, one-fourth of barley and one-fourth of wheat.

1612. On heavy land do you grow wheat instead of barley, which you would otherwise do, supposing the malt tax were taken off?—No doubt we do. We frequently take a crop of barley on our stiff soils instead of a crop of wheat, therefore we take wheat frequently in alternate years, which is against the crop no doubt.

1613. Will you state the rotation on the six-course system in Essex?—Fallow, barley or wheat, clover or beans, wheat, and then probably peas or beans, and wheat again. That is how it operates, that we do not grow above one-fifth of barley instead of one-fourth, which we should grow otherwise.

1614. Is it your opinion that if you grew in its regular course your crop of barley, your land would be better cultivated, and consequently your crops of wheat afterwards would be heavier?—I believe that the crops of wheat would be far more yielding. We know that variation of cropping is suitable to all soils.

1615. Then so far as the rotation of crops goes, do you believe it would be very beneficial to have the malt tax repealed?—I believe it would be beneficial in that point of view, but I do not look upon that as the main point of benefit from the repeal of the malt tax at all.

1616. Do you know anything about Mr. Gladstone's Malt by Weight Act?—The Malt by Weight Act, I believe, is being used by very few maltsters in our neighbourhood. In a year like this, when the barley has suffered from wet, and of course is lighter per bushel than it otherwise would be, provided it received no wet, it has been in use. I know a maltster who has used it, and has been benefited, and got it cheaper by that mode. He speaks of having received a benefit from it, in consequence of the weight of the barley. In an ordinary season, when the barley is got in dry, he should not use it, but in a season like this he finds it an advantage to him.

1617. If he does use it, I conclude he buys inferior class of barley, and uses that?—He would buy the same description of barley if he could; but he buys this because he sees he can get no other; they are damaged by the weather; in fact, all barleys were, with the exception of a small quantity, of the best.

1618. Then is it your opinion that it is not a great benefit to the maltster?—I believe it is a slight benefit to the maltster; but I think very little to the farmer; it comes in a very indirect way to him.

1619. Have you ever tried malt for feeding cattle?—I have tried it upon young cattle, young bullocks, on animals got up for show, or feeding for Smithfield, or for any exhibition. I have occasionally put a small quantity of malt in their food.

1620. You know the Act which is called Mr. Gladstone's Act; has that Act been put in operation in your part of the country?—I believe it has been entirely inoperative in consequence of its restrictions. I have used the mixture, but, as the last witness told you, it was so ground up and so mixed up, that we did not know what we were using; it was very little use to us.

1621. Mr. *Ayrton.*] Before this notice was given to you, to which you referred, was there much communication between the farmers and the Excise?—The Excise in our neighbourhood rather had an impression that our mode of treating the barley could be allowed, and they winked at it, as it were; it was carried on to a very great extent indeed.

1622. Did you only go to the extent of steeping the barley without putting it on the couch at all?—No, it was always put into the couch, and it was thrown out when it began to germinate, and it was turned over each day; but there are no kilns on the farms now; there used to be a malting on every little farm, but there is not one now.

Thursday, 4th July 1867.

MEMBERS PRESENT:

Mr. Ayrton.	Mr. Hunt.
Colonel Barttelot.	Mr. Laing.
Sir Edward Manningham Buller.	Mr. Shaw Lefevre.
Lord Eustace Cecil.	Mr. More.
Mr. Dent.	The O'Conor Don.
Colonel Duncombe.	Major Parker.
Mr. Goschen.	Mr. Read.
Mr. Hardcastle.	Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

Mr. JOHN CLAYDEN, re-called; and further Examined.

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1623. *Chairman.*] I THINK, when we left off on the last occasion, we were asking you questions upon Mr. Gladstone's Act, about malt for feeding cattle; and I think you stated that the Act had been entirely inoperative, that you had used the mixture, but that it was so mixed up that it was of very little use to you?—I found it so; the price was too high for the goodness that it contained, and the good it did the stock. When it was ground so exceedingly small it stuffed up the animals' noses.

1624. That is to say, the linseed and the malt were ground so small that it was blown away, and was of very little use?—It got up into their nostrils and made them sneeze; it was practically useless in consequence of being encumbered with so many restrictions.

1625. Have you made many experiments in feeding cattle with malt?—I have occasionally given it to young stock, stock getting up for show, and stallion horses, and after a hard day's hunting; but the duty on malt has precluded its being used to a great extent.

1626. If the duty were taken off malt, do you think that it would be generally used for feeding purposes?—I think that a considerable portion would be used, but in a saccharised state in preference to a dry state.

1627. Have you ever tried malt for sheep?—I have, but damaged malt rather; I made a great quantity of malt one year, in consequence of barley being low, for my own consumption, and unfortunately left it at the malt house; it was put into a bad place, and when it was fetched away after harvest we found that it was impossible to make good beer of it, and we gave it to our ewes and lambs, and they certainly did well with it.

1628. You found that it answered for them?—I should say that it was far preferable to dry barley, but it was only used in consequence of being damaged.

1629. Have you tried it with reference to young lambs?—I have not, only when they eat it out of the same troughs with their mothers. The fact is, that I only used it up in consequence of its lying in my way; the ewes seemed weak after lambing, and it restored them very much indeed.

1630. Then, is it your opinion that, supposing the duty was taken off malt, it would form one of those articles that would be used for feeding purposes?—To a certain extent it would. I do not suppose it would ever come into competition with oil cake and with saccharised barley.

1631. I think you told us the other day, that you were feeding, or going to feed, with some barley that had speared?—It was the case; I was feeding with it, and so were my neighbours.

1632. Did the Excise interfere?—The Excise interfered generally in our neighbourhood.

1633. In what way did they interfere?—They came to the farmhouses and told them that they were acting unlawfully.

1634. How had you speared that barley?—By putting it first into a tub or cistern, and then exposing it on the floor for successive days, of course putting the quantity in on one day which we were going to use eight or nine days after, enough for our consumption, and turning it gradually down on the floor.

1635. The Excise then interfered, and said that you had gone beyond the law?—They interfered and said that we were going beyond the law. It was coming generally into use in our neighbourhood, and they stopped it.

1636. So far as you understand the law, at what point are you obliged to stop, how far may you go?—I believe, no further than the barley in its natural state or ground into meal.

1637. Will you hand in that notice from the Inland Revenue which you have in your hand?—Yes (*handing in the same*).

1638. It says here, "that saccharisation of grain, as described, by germinating, would render you liable to penalties, unless previously licensed as a maltster"?—Yes. It does not get into a proper state for consumption until it is saccharised or grown.

1639. And is it, when in that saccharised state, infinitely preferable to other food for cattle?—Decidedly preferable to dry corn.

1640. If you stop short of that saccharisation, it is of little use or avail to you?—Very little; in fact, it becomes a different feeding substance when that saccharisation or growing takes place.

1641. When the Excise interfered, you gave up further proceedings in that matter, I suppose?—Decidedly; it was generally stopped in our district.

1642. Up to that time, you thought that you were at perfect liberty to use barley in that state?—We had considered so, and the Excise thought we were also.

1643. Mr. *Ayrton.*] How long ago was that notice sent?—Two years ago next November; it was sent to the Hon. and Rev. Mr. Talbot.

1644. How long before the interruption had the practice prevailed?—It began on a small scale about 1859, and from 1863 to 1865 it increased most amazingly.

1645. *Chairman.*] Up to that period you had had no hindrance in going through the process which you have described?—Not the least.

1646. Did the local officers object, or was it an order from London?—The local officers came to us; from whence they received their order we do not know.

1647. Had you used it very much up to that time, or had you only just begun to use it?—I had only just begun to use it; but a neighbouring farmer of mine, a tenant of Lord Braybrooke's, had used it to a very great extent indeed, and was feeding 400 or 500 sheep, and a lot of bullocks with it.

1648. Can you say from your own experience, or on good authority, whether or not those who have used it believed it to be as good, or nearly as good, as any other food which they had used?—They believed it to be by far the best; I have instances in my pocket-book which I could read to the Committee.

1649. If they are authentic, and you can vouch for the accuracy of them, will you do so?—I can vouch for the accuracy of them. The first case is this: "In the winter of 1859, a horse, belonging to Mr. Rolfe of Clavering, was unwell, skin tight, flank tucked up, eating 14 lbs. of oats daily, besides hay-chaff, and was not improving, but when put to 10 lbs. of saccharised barley daily, and no hay-chaff, but straw-chaff, and mixed mangold wurzel, recovered health speedily, and condition also; cost of keep, 5 *s.* per week less than previously." Here is another case: "In the winter of 1860, a post-horse, six years old, of Mrs. Spicer's, 'Rose and Crown' Inn, Saffron Walden, was unable to do a day's work, although eating 14 lbs. of oats daily, and hay *ad libitum.* A 10 mile journey produced loss of appetite, and great weakness. He was offered for sale, and only 15 *l.* was bid for him; but after eating one quarter of saccharised barley, costing 26 *s.*, he was so improved, that he was actually sold to a dealer for 26 *l.*" Here is a case that I have in regard to bullocks: "In 1864, a lot of 25 bullocks were purchased at Braintree Fair, on the 1st October, by Mr. G. Collin of Henham. They were fed entirely on non-dried barley malt the first month, 7 lbs. daily, going out into a pasture in the day; after this period, upon 14 lbs. daily, and a half-bushel of turnips, with straw-chaff, to 1st January. From this period to the 14th February, when sold, they had 6 lbs. of oil cake daily in addition. These bullocks paid more money than any other lot in this district, and it is worthy of remark, that 25 pigs, fed entirely upon their excrement, gained in value 25 *s.* in the same period." Those facts can be authenticated in any way that is thought proper.

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1650. Your decided opinion, as I understand, is, that if there were no interference by the Excise, with regard to the saccharisation of the barley in the way which you have described, it would be a very great benefit to the farmers?—I am quite certain of it.

1651. Let me ask you one other question upon that point; do you think that the growers of inferior barley, if they were able to put it into that state of saccharisation which you have described, would use it instead of oil cake and other foods? I believe they would use their inferior barley to a very great extent.

1652. Who was the exciseman that interfered at the time of which you have spoken?—I do not know; I have nothing whatever to do with the Excise, only my veterinary surgeon came to me and said that they had stopped them at Wenden Hall.

1653. Mr. *Ayrton.*] In what district is that?—In the Saffron Walden district.

1654. *Chairman.*] You cannot tell us the amount of saccharine matter in the barley, can you?—I cannot; my opinion of the dry barley is that it is very injurious to our stock; I have seen animals completely set fast by eating dry barley on the stubbles; it has the effect of inflammation or stiffness in the joints, and the shoulders are set.

1655. What you mean by "speared barley" is barley wetted till it sprouts, is it not?—Yes.

1656. Mr. *Ayrton.*] Is there any difference between the sprouted barley, such as you prepared for food, and malt as it is sold by the maltsters?—A very great difference.

1657. How is that difference perceptible?—It is exceedingly wet and heavy; squashy, you would call it; it becomes exceedingly increased in measure.

1658. Could anyone by drying it bring it to the condition of malt?—Very easily indeed; that is the fear of the Excise.

1659. You, or those with whom you are acquainted, never did attempt to dry it?—Never.

1660. Did you use it for food immediately in the soft condition?—In the soft condition mixed with chaff, or whatever you please.

1661. So that you only prepared small quantities from day to day, as you wanted food for a few days hence?—Yes; supposing that your consumption was a quarter a day, you would wet a quarter a day seven or eight days previously.

1662. Was this practice confined to the large farmers?—No, I think it is done by small farmers probably where the Excise would not go to look after it; I think there are very few farms where it is not done to a certain extent, and has been done to a larger extent.

1663. Do you know the circumstances which induced the Excise to interfere?—I do not.

1664. Have you any reason to think that any attempt was made to dry the germinating grain?—I have no reason whatever to think so, nor do I believe that it was attempted.

1665. Do you think that it would be possible for the Excise to make such arrangements as would protect the revenue from a fraud in that use of the barley?—I think it would be, but the injustice of the tax is so great upon free trade that we should rather not have that done, but be left free to use it in the way we think best.

1666. I am asking you whether you yourself see any difficulty on the part of the Excise in their making such regulations as would prevent

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the mere germination of barley, for the purpose of feeding, being converted into a means of defrauding the revenue?—I think that it would be impossible to do it to any extent; formerly on most farms there were malt-houses; I pulled down last year a farm where we found a malt kiln, where we should not have expected it; I have other premises of mine where there is a cistern even which has been used as a malt-kiln; malt-kilns were common on most farms.

1667. When those malt-kilns were used it was the regular malt for brewing that was made?—It probably might be so, but malt-houses were more general formerly by far than they are now.

1668. What do you mean by "formerly"?—I suppose the time when as Mr. Everett told you a sack of barley was taken to the maltster, and 1 *s.* and a sack of malt brought back.

1669. As far as we can discover, that was done when the malt duty existed?—It would be a small tax then, if it was ever felt; I should have thought that it would be impossible to do it.

1670. As far as your memory extends back, there has always been a malt duty?—Yes.

1671. And a considerable one?—Yes.

1672. Then any change that has taken place has not been the result of the malt duty?—It might have been in consequence of that or might not, but the probability is that it was so. We know that malting has got now into much fewer hands than formerly.

1673. What we do not know is, that that is in the least degree affected or influenced by the existence of the malt duty?—I should imagine that it has been very much so.

1674. Why should you imagine that?—The excise regulations then must have been on a more extensive scale than they are now, otherwise it is impossible that each particular district could have been surveyed in the manner it is now, because the malthouses are now brought together. When they were dispersed all over the country there must have been a greater number of excisemen if they secured it against fraud.

1675. Will you tell me when the practice of using malt for feeding began?—For 20 years it has been going on, but I believe that it was chiefly resorted to at first for the feeding of pigs, and then extended itself to other descriptions of stock. I mean saccharised barley.

1676. Do you think that for the last 10 years it has increased to a considerable degree?—It increased amazingly about three or four years ago when its virtue began to be discovered. The farmer, with the low price of corn, had to look to expedients, and he found that that was an exceedingly good expedient. It was confined previously to pigs and horses.

1677. Do you see your way to any arrangement being made by the Excise to allow that to be done under such conditions as would not enable dishonest people to defraud the revenue?—I should think that it could be done, but by far the simplest way would be to abolish the malt duty.

1678. I am asking you, as a practical man, whether you see your way to its being done without the revenue being defrauded?—I should not think that it would be exceedingly difficult in practice. I know nothing of it myself, only I have heard that there have been instances of this kind, after they had done baking they popped a lot of this sprouted barley into the oven, and it came into a semi-malted state.

1679. You think that if the farmer was prohibited from having any arrangement for drying this germinated grain he might be allowed to use it?—Yes.

1680. You think that he might be allowed to do that without inspection or occasional inspection from the Excise?—Most certainly.

1681. Supposing that he were subjected to a certain amount of inspection, it would not be a grievance, would it?—I should think that few farmers would care about the exciseman's visit. The exciseman is never popular.

1682. He only goes into an outhouse?—Yes.

1683. And considering that outhouses and farms are always open, and anybody may go into them, it does not seem a great grievance that the exciseman should visit them?—No, but the Excise, I think, would not thank you for giving them that to do in a wide-spread district; they have enough to do now.

1684. But supposing that the farmers were brewing, and that there were a tax upon beer, he would be subject to inspection?—I should tax him according to the number of acres he occupied; a license for a certain number of acres, the same as I would tax the gauge of the copper of the brewer every time he brewed.

1685. Supposing he did not make beer for his own use, then what would be the justice of taxing him?—Supposing he did not, that would probably be an injustice; you should tax the cyder grower in the same way.

1686. Sir *E. M. Buller.*] Supposing a farmer was inclined, after having got this malt into a saccharised state, to dry it in his oven, he would be able to dry a considerable quantity, would he not?—I suppose he would, but I think that he would be very soon detected.

1687. But there is no difficulty in drying a considerable quantity, then, in the oven?—A considerable quantity, I think, could not be dried; and you must recollect that the farm premises are frequently very far removed from the oven. It is not now as it used to be on a little farmhouse, where the oven was close to the farm, but you have to bring it, probably, half a mile from the house to the oven.

1688. You do not have the oven half a mile off from the farm, do you?—Frequently; my oven is half a mile from some of my premises.

1689. That would be a large one, I presume?—It is a large one, of course.

1690. It would hold a great deal of grain?—I should imagine not.

1691. How many bushels do you think it would hold?—I do not know. You must recollect that it would not retain heat enough for a few bushels; it is not like a kiln where the fire is underneath; there you would have only the remains of the heat from the bread.

1692. Would there be any great difficulty in adding a little heat?—It could not be done without taking the malt out.

1693. It is a brick oven that you fill with brushwood; you then burn the brushwood, and put in the bread?—Yes.

1694. That would leave a certain amount of heat, which would be available for drying grain?—A very small quantity.

1695. Could you dry, for instance, a couple of bushels?—Of course it would depend on the size of the oven; but it must have an exceedingly thin

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thin layer, and it could not be done in one process.

1696. Not even one bushel?—I do not suppose that there would be heat enough to dry even one bushel; but I do not know much on that point.

1697. You say that there are bakehouses near the homes, and that the germination of the grain could be done in out-buildings?—Yes.

1698. Was there any change of circumstances in November 1865 which you have given us as the date of the notice from the Inland Revenue?—No change, except from the feelings of the persons who executed the law.

1699. Major *Parker.*] Do you limit your objections to the Gladstone preparation to the mere fact that it is inconvenient?—No; the price at which it was manufactured was so exceedingly high; they charged more per ton for it than for really good oil-cake, therefore we thought it very expensive food.

1700. Any inconvenience of that kind might be remedied, might it not, by an addition similar to that in bean meal, of any other flour, or chaff, or bran?—It was mixed with chaff; still it was expensive, and did not do the good anticipated from it.

1701. Ground malt you do not suppose would be inconvenient?—But I would rather not have malt ground too finely.

1702. Are you aware, when you speak of the use of saccharised barley, whether it was sanctioned by law, provided you gave notice to the Excise?—Those in our neighbourhood know that it was done, and thought that it was done in a perfectly legal manner, till they received that intimation.

1703. Mr. *Henry Surtees.*] You mentioned that the barley you steeped for feeding your stock, after being steeped, was moved forward on the floor day by day?—Yes.

1704. To what floor did you allude?—The common clay floor of the building which it was in; not a floor made expressly for the purpose, but wherever the building that it was steeped in; a common out-house. It was kept in a bed, and moved on that floor.

1705. The floor of a barn?—The floor of a barn.

1706. The floor of a barn would answer for the purpose?—Decidedly.

1707. Mr. *Read.*] You do not move it to other floors?—You keep it on the same floor, but keep working it down. Supposing that I had a place for it, I should have the cistern at one end, and the door at the other, and be moving it down day by day.

1708. Did you say it was supposed that some people had dried this barley and made it into malt?—I have heard, but have never heard it authenticated that people have done so. Cottagers have been known to dry their sprouted gleanings of corn.

1709. And have they the opportunity, if they can avoid the excise, of sprouting barley and drying it in their ovens?—Yes, but I do not think that many of them have, because I think that private brewing has become very nearly extinct in our neighbourhood.

1710. You said that the price of this malt prepared under Mr. Gladstone's Act for feeding cattle was too high?—Yes.

1711. Do you know what you paid for it?—I do not think that I can inform the Committee accurately here, but I could at home. I should think that it was 11 *l.* or 12 *l.* per ton.

1712. Are you aware that at that time when you were paying 11 *l.* or 12 *l.* per ton for that prepared malt, you were selling your inferior barley for 6 *l.* a ton?—There is no question upon that point at all.

1713. So that somehow or other the malt cost about double?—Yes, nearly 100 per cent. more; the inferior barley was never more than about 6 *l.* a ton; 9 *d.* a stone. But of course we could not tell what description of barley that preparation was made of; it might have been made of more valuable barley than that.

1714. You would never think of giving horses dry barley?—No.

1715. Did you ever feed them on dry malt, or would you do so?—No.

1716. You would think that malt would be used rather as a condiment and to flavour other food than as a feeding article itself?—Yes.

1717. It would make other food more palatable?—Yes.

1718. Are you aware that malt is considerably employed in the manufacture of the cattle foods?—No doubt of it.

1719. Mr. *Ayrton.*] Will you tell us what you mixed with the germinated barley before it was prohibited for food?—Straw chaff.

1720. That was mixed in immediately you considered it fit, I suppose?—Our cattle are always tied up with their heads to the best food. Every bullock has his roots loose in the yard, but is tied up twice a day for the more expensive food.

1721. After you have gone through the process of malting, you present your cattle with the best food you have?—In Mr. Gladstone's Act it is dried and ground.

1722. What in quality would be the difference between the food which you gave when you used germinated barley, and the mixture of malt and other matters under that Act?—Mine was much more simple and much less expensive.

1723. Was it not substantially the same food?—No, I think that the Act compels a certain mixture of oil cake and linseed.

1724. It is not a sufficient mixture under the Act that it should be mixed with straw or chaff then?—No, it is made under the Excise, and the oil cakes inspected by them, and the linseed inspected by them, and ground on the spot.

1725. Would your making mash be just as difficult to use for the purpose of baking beer, as the compound under the Act?—You could not use it; it would not act in that way.

1726. You considered that it would be quite impracticable to use it for any purposes of malt or beer, after it had been mixed with the chaff or other matter?—Quite impracticable, I imagine, even before it is mixed, and without the chaff.

1727. It does appear that some people illicitly dried this germinated barley, and converted it into malt?—I have no real knowledge of that fact; it has been stated so.

1728. Would they be able to do that if it were mixed with chopped straw?—It would not be worth the trouble.

1729. Practically, you think that it could not be used in any way of that description?—No.

1730. Therefore the excise would be as completely protected by mixing the germinating barley with this chaff or other matter, as they are by mixing the malt with meal?—That is not exactly

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exactly so, for this reason; that it comes into this stage before it is mixed with the chaff, and is mixed with the chaff before it becomes food for cattle.

1731. If the law required you immediately to mix it with chaff, would that then be as good a protection to the Excise as the mixing of malt with the matters mentioned in the Act?—It could not be mixed with chaff in its early stage.

1732. Afterwards, I mean?—First it would be grown, because the chaff would become sour and worthless altogether, and the germination of the grain would not take place so well.

1733. If the law required you, immediately you had finished the process of swelling or sprouting the barley, to mix it with chaff or other matter, would that protect the Excise just as well as the law which now requires the malt to be mixed with oilcake or other matters?—It would be my interest to do so, but I should at once remove it to the place where the cattle were grazing.

1734. Could not the Excise be protected from fraud by insisting upon your germinated barley being mixed with chaff or other matters at some particular period, just as they are protected by the law which requires the malt to be mixed with certain matters?—When it gets to the bullock's manger, that is the place to mix it.

1735. Or before it is removed from your floor?—I see no good in that.

1736. Is there any difficulty in doing so practically?—There is a great difficulty in mixing it with a cumbrous lot of chaff, because the chaff becomes sour and worthless. I think that the restriction would be an exceedingly serious one. It would require an out-house of considerable size for chaff to be mixed there.

1737. I presume that the cost to you of steeping and keeping the barley until it germinates is nominal?—Nearly part of a day's work for a man, or a day's work. There is the water to put into the cistern, and you keep turning out a piece every day.

1738. Then you get by that all the benefit you could get under the Act, without the enhanced expense of malting?—We use our own materials in the way we like best for making food for cattle.

1739. Mr. *Hardcastle.*] How many days is this germinating going on?—Something like eight or ten days; in warm weather it would not require so long to germinate as in cold weather.

1740. To what extent do you carry the process?—Not so far as for malting.

1741. The green sprout does not appear?—No, the green sprout does not appear; when the root is well up, it is in a good state for food.

1742. In this saccharised barley, you do not rub off the root, do you?—No; it is put in with a shovel, put in just as it is growing.

1743. Then there is a distinction between that and the use of ordinary malt, because if you use ordinary malt, the culm has been taken off?—Yes; this culm would not remove in its green state.

1744. There is a difference between dry malt and your saccharised barley, because when you feed with dry malt, you feed without this malt culm, but when you feed with saccharised barley, you have this culm with it?—Yes, but it is not the culm that makes the difference.

1745. How do you know that the nutriment does not arise from the culm?—I am satisfied on that point; it makes the straw and everything else exceedingly palatable, and is a very healthy and good thing, but it has no real fattening quality; I imagine it is the drying process that gives it that flavour.

1746. Mr. *Ayrton.*] Can you give us the results by a reference to those who have tried it, of this way of feeding cattle?—I could get you many results; I have already mentioned some.

1747. Mr. *Dent.*] You said just now that you thought there was no fattening quality in the malt culm; do not you think it very good for milk?—No doubt it is; it makes the cows eat up their other food.

1748. But apart from that, do not you think that when used for milch cows and ewes and lambs it makes them eat their other food better?—Yes.

1749. I was surprised to hear you say about Mr. Gladstone's mixture that you objected to it because it was ground so small, because I never found that?—There is always a loss in exceedingly fine ground food, but the mixture altogether seemed to get up their nostrils.

1750. Would there be any practical difficulty in farmers who wished to saccharise their barley entering a part of their premises in the same manner that a maltster does, and giving notice of their wish?—Of course, if the law compelled it, they must, but I think it would be a great injustice that it should compel it.

1751. Mr. *Hardcastle.*] Why?—Because not to be able to use my own produce in the way I like is a disadvantage.

1752. Mr. *Dent.*] There would be no expense to you in doing it; it would not enhance the cost of it?—No.

1753. You would make the entry once for all; it would give you a little trouble, and possibly annoyance?—No doubt of that.

1754. But no extra expense or cost?—No.

1755. Mr. *Hunt.*] You have told us that this process of germinating barley for feeding purposes was stopped in 1865; I suppose it had been done in violation of the law before that?—Not that we were aware of, nor that the excise knew of.

1756. Should you see any objection to a barley grower giving a bond not to infringe the excise laws, and under that bond being allowed to germinate barley?—They are not good men to give bonds.

1757. But they would rather germinate it under that condition than not at all, perhaps?—I dare say they would, but I do not see why we should be encumbered with that restriction.

1758. You think it would be a relief to you to be allowed to do it under those conditions?—I think it would be very unjust that we should not be allowed to do it.

1759. *Chairman.*] Could you put in any experiments that you could verify upon cattle fed upon this saccharised barley?—To the extent of the cases that I have already referred to, and also with respect to a lot of lambs of my own.

1760. Perhaps you will kindly do so in such a form, that we may be able to put it in the Appendix?—Yes.

1761. Mr. *Read.*] There is a good deal of difference, is not there, between sprouted barley and malt, as far as regards its flavouring quality?—Yes.

1762. That whereas malt gives a relish to the whole of the mass, sprouted barley is simply an article of food?—It is so.

1763. And you fancy that that extra flavouring

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ng quality is impaired by the drying?—Yes, by the drying; we know that according to the way in which malt is dried, so does malt dust become valuable or the contrary; the paler the malt, the more beneficial we consider it for stock; it is always sold with greater ease than the higher dried qualities of malt dust.

1764. Mr. *Henry Surtees.*] What does malt dust sell for?—Eight to 10*s.* a quarter, or even 12*s.*

1765. Do you know what is the per-centage of malt dust made from 100 quarters of malt?—I am not aware.

1766. Mr. *Dent.*] Can you give me the comparative price of a ton of saccharised barley, a ton of cotton-seed cake, and a ton of linseed cake; take not the very worst barley you could have, but take average barley; there will be a certain amount of labour upon that; if a quarter of barley takes 10 days, to be turned every day, there must be a certain amount of labour upon it?—The labour in turning a quarter of barley would not be a penny.

1767. But the labour of turning a ton of this barley every day for 8 or 10 days must be something?—It is done by your cattle man on the farm.

1768. Still, if he is spending his time in preparing this food, the wage question would come in so far?—No doubt of it; I should remark that I have got to fetch this cotton-seed cake from the station, whereas I have the barley on my farm; I think, therefore, you must not go into that difference.

1769. Perhaps you can make it out and hand it in?—Yes.

1770. Mr. *Read.*] How long, after this sprouted barley is in a fit and proper state for cattle, could you keep it without its deteriorating?—Not more than one day, I should think; I should only take my day's consumption, that is to say, I should wet my day's consumption according to what I was using; that would be my rule.

1771. Mr. *Ayrton.*] I understand that if you were to mix anything with it, it would entail upon you the trouble and inconvenience of carrying the article, whatever it might be, into the room, and then carrying it back again to the cattle?—And then it would require a large spacious place also for the purpose.

1772. Mr. *Dent.*] Would you say five quarters of barley at 30*s.* a quarter, 7*l.* 10*s.*?—No; I should not use a 30*s.* barley in a general year.

1773. *Chairman.*] Did you look into the experiments that were made by Mr. Laws some two or three years ago?—I glanced at them.

1774. What was your opinion with regard to them?—That the cattle being fed almost entirely upon malt were surfeited; their food, which would have been good in a small proportion, became to them unpalatable.

1775. Do you consider that those experiments were a fair test of the question, or that they were not a fair test of it?—I consider that they were not a fair test.

1776. Do you agree with one of the general conclusions which Mr. Laws arrives at, and which is thus stated: "The general conclusion from the result of the direct experiments with cows, oxen, sheep, and pigs, is that a given weight of barley is more productive both of the milk of cows, and of the increase in live weight of fattening animals, than the amount of malt and malt dust that would be produced from it"?—Given in the whole state as barley, it would be of no use to animals whatever.

1777. I understand that Mr. Laws' experiments were made with barley and with malt, and his deliberate opinion is that the barley is better as a food than malt; and I ask you as a practical man, whether that is your opinion?—If the barley was ground into meal it might be so, but given whole I am sure it would not be the case; but I doubt it even if it is ground.

1778. Your opinion decidedly is that whole barley would not be so productive of flesh, fat, and milk as malt?—Decidedly.

1779. Then, as you said just now, your opinion is that these experiments of Mr. Laws are not a fair test to guide us in our judgment on this question?—I believe that they are not a fair test in consequence of the animals being fed too exclusively upon one description of food.

1780. To go now to brewing, do you brew for your people for haying and harvest?—We do all the year round brew small beer.

1781. You brew for them, and do not give them malt to brew for themselves?—No; occasionally in one farm of mine, they have malt in the harvest.

1782. Which do you find the men would prefer, malt or beer?—Beer.

1783. Do any of your men as a rule brew for themselves?—Not to any extent; there may be one or two, but scarcely any of them do so.

1784. In your part of the country is it the rule that they brew, or that they do not brew?—As a rule they do not brew.

1785. If the malt tax were taken off, do you think that that would make any difference in that respect?—It would be some time before it came into operation in that way; I do not think that it would make any sensible difference for a time.

1786. Are you of opinion that the coppers which the poor people now have, would be sufficient for all brewing purposes?—No doubt of it.

1787. Is the public-house beer in your neighbourhood, generally speaking, not of the best quality?—It is not considered to be good.

1788. Do not you consider it to be very injurious to the poor men's health?—We find it so when our men have gone to the public-house overnight and taken too much; or even when they are at work in the field, we find that they work better and more regularly with our own home-brewed beer.

1789. The men themselves would prefer to have your beer given to them, rather than to have money and be obliged to spend that money in beer?—Yes.

1790. They would rather you would supply them with beer than that they should send to the public-house to get their beer?—Yes; still they are fond of going to the public-house occasionally.

1791. In the haying and harvest would they prefer to have the beer, or prefer to have the money instead of the beer?—The beer; I have an instance of that now on an off-hand farm of mine, where the men have for the last two or three years been taking money instead of beer, but this year they said they would have the beer; my bailiff, when I went up on Monday morning, said, "I cannot get on with my men, they will have beer this year," which he did not wish.

1792. Mr. Hunt has asked you whether if you

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gave a bond, and so were allowed to sprout your barley, the farmers would think that a boon to them. I wish to ask you whether you think that if the duty were taken off malt, and a beer duty were imposed in its place, you would rather have that instead of paying the bond for sprouting your barley?—That would be a far greater boon. For my part I do not mind what tax is put on in lieu of the malt tax, but let us have a repeal of that obnoxious tax.

1793. Have you turned your attention to a substitute for the malt tax?—I cannot say that I have, only I would grant it by license, and I see no objection to taxing the farmer according to his occupation.

1794. You would see no objection to putting a duty upon the farmer, in regard to his house, and farm, and upon the private brewer, in regard to his house, and a brewer's license perhaps upon the brewer?—I should see no objection whatever to that.

1795. You would have an objection perhaps to an exciseman being about your premises?—I think that there is a great objection to it.

1796. But if a duty upon beer could be imposed in any other way you would see no objection to it?—Get rid of the malt tax, and get the best substitute that you can, I say.

1797. You think that the repeal of the malt tax would be a great boon to agriculturists, and a great boon to the labouring men?—I do.

1798. Sir *E. M. Buller.*] You say that you brew beer for your labourers, and that they can work after your beer, and not after the public-house beer; what is the strength of your beer?—Sixty-three gallons to the four bushels, about 3½ barrels to the quarter.

1799. In point of fact it would take a great deal more of your beer to make a man drunk, than of public-house beer?—Because it is more pure, I imagine.

1799*. I merely ask you the fact, whether it does not take a great deal more of your beer to make a man drunk. When a labourer goes to the public-house, he gets drunk sometimes, and it would make no very great difference in that respect; that is to say, if he got drunk even with good beer, he would not be able to do his work quite so well the next day, would he?—With home brewed beer he would have far less headache, and be more fit for his duty.

1800. But, I presume, he would not be well able to do it. It is from drinking to excess, that he is unfit for his work; he gets too much at the public-house, and you do not give him too much?—Just so.

1801. In point of fact, do not you give your men beer for the purpose of getting more work out of them?—There is no doubt that they do more work on beer.

1802. And giving them beer is the cheapest form of giving them wages, when you want a hard day's work from them?—It is the form in which they are most accustomed to have it.

1803. Do not you know, from your own experience, the truth of that proverb, that "A wet groat is better than a dry shilling?"—No; a dry shilling is far better than a wet groat.

1804. But if you want a man to work as long as it is daylight in summer, would you not find that the man does work if you give him the beer, and does not if you give him the shilling?—But you must remember that his labour is done by piece work and therefore it is the interest of the man as well as of the master that he should do it.

1805. In your neighbourhood, you think that the labourers might brew, but they do not brew?—They do not.

1806. You do not know of any labourers who do brew, do you?—Yes, I do know some.

1807. Did you ever taste their beer?—No, I cannot say that I have. The reason why our men prefer not having malt in harvest is this: that if there are, say 10 or 15 men on the farm, five of those probably would make very good beer, and the others bad beer; and of course these men all working together, they would not like to find that some of them were drinking worse beer than others.

1808. Do the men brew that malt, or get it brewed?—They brew it themselves; and some of them would manage it well, and some very badly, and that is the reason why they prefer money or beer from the farmer.

1809. It would be a better arrangement, in your opinion, that the farmer should brew for his labourers, than that he should give them the malt?—Yes. Sometimes it happens that, in order to save trouble, the farmer gives a brewer an order to send each of his men the amount of best beer they would require.

1810. Mr. *Laing.*] If the tax were transferred from malt to beer, would it not knock up that system of giving malt to labourers to brew for themselves, because then they must be subject to excise regulations, I presume?—It is not done to any extent. I do not think that that would be the result practically.

1811. Do you continue the practice of brewing now yourself?—Yes.

1812. Suppose that the tax were transferred to beer, and that you were subject to excise visits and regulations, would it make a vast difference to you?—I do not know that it follows that I should be subject to that, because I am only brewing for my men, but I would rather have even that than the malt tax.

1813. Even if it were found necessary to subject private brewing to excise regulations, you would prefer that to the present tax?—Yes.

1814. Will you state why?—Because I should receive benefit from it, and I should be allowed to use my own produce in that case in any way I liked for the benefit of my own farm.

1815. Lord *Eustace Cecil.*] With regard to a remark made by the honourable Baronet, that it was rather the excess of beer at the public-house which did harm to a man than the adulteration of the beer, do you know anything of the public-house beer in your neighbourhood?—No, except that when the men take it, it makes them thirsty; a man does not stop at a pint, but goes on with it.

1816. Are you aware whether the beer is of a sweet and muddy colour?—No, I think that it is rather of a salt nature.

1817. Have you reason to suppose that salt is constantly put into it to increase thirst?—I understand so.

1818. Are you aware that within the last half-year a very large amount of sugar has been used by brewers?—I am.

1819. And do you believe that sugar has a more unwholesome tendency than malt?—I believe so, because beer brewed from sugar will not keep in hot weather.

1820. Do you imagine that that has an effect upon your labourers, and that they are not likely to be

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be as fit for work after drinking that beer?—Yes.

1821. Mr. *Hunt.*] You do not speak from experience, however?—No.

1822. Merely that you have a Briton's prejudice in favour of malt?—Not at all; my object is to make malt the cheapest article that can be used.

1823. Lord *Eustace Cecil.*] Is it the case that in cyder counties, cyder is given instead of beer?—Yes, in the same way as by us, for the production of labour.

1824. There is no tax upon cyder, I believe?—No.

1825. Or upon the apples from which cyder is made?—I think not.

1826. Does it not result, therefore, that the beer-drinking counties are very unjustly used, as compared with the cyder-drinking counties?—That is my opinion.

1827. In the one case there is a tax upon the labourer's beverage, and in the other there is none, that is so, is it not?—Decidedly.

1828. You are, I believe, of opinion, that the malt tax increases the price of beer to the consumer?—I am.

1829. At what price can good beer be now brewed per gallon?—With the present price of malt, at about 1 *d.* per pint, I should imagine.

1830. Can you tell us what you suppose the same beer would cost per gallon if the malt tax were taken off?—With the malt at 9 *s.* a bushel, with the present tax on, four bushels would cost 36 *s.*, and 4 lbs. of hops, say at 1 *s.* 6 *d.* a lb., would be 6 *s.* The produce would be 63 gallons of beer, at 8 *d.*, which is exactly 42 *s.*; that is what it costs now, at 1 *d.* per pint.

1831. What could you brew it at per gallon, if the malt tax were taken off?—If you take the price of malt at 5 *s.* 6 *d.* per bushel (which is 40 *s.* a quarter for the barley, and 4 *s.* a quarter for the making,) it would be 22 *s.* for the 4 bushels, and 4 lbs. of hops, at 1 *s.* 6 *d.* the lb., would be 6 *s.* more; in all 28 *s.* The produce would be 63 gallons of beer at 5 $\frac{1}{2}$ *d.*; thus proving that the duty on malt raises the natural price from 5 $\frac{1}{2}$ *d.* to 8 *d.* per gallon.

1832. Do you think that if the malt tax were repealed, it would have a very great effect upon the quality of the beer?—I imagine that the quality would be very much improved.

1833. Both that now brewed by private brewers, and that brewed by publicans?—No doubt both.

1834. And you think that drunkenness would be diminished in consequence?—The purer the beverage, the less drunkenness you would have.

1835. Going to a different subject, do you know anything about the relations between the maltsters and brewers practically?—What I know practically is this, that the maltsters, to a certain extent, are dependent upon the great brewers for the sale of their article. A great brewer comes into the market at the early part of the season, and is a competitor with the maltster.

1836. Are there not many ways in which the malt tax acts unfavourably upon the maltster?—Yes.

1837. Does it not oblige him to have a large capital on hand for the purchase of barley, and payment of the duty?—It increases the capital required by the maltster generally 30 per cent., sometimes even more.

1838. It requires capital also for the payment of duty at a short notice?—The payment of duty, at a short notice, no doubt, has interfered very much with the maltster, and been injurious to him, because no sooner has he malted his barley, than he is compelled to pay the duty, and if he cannot sell his malt, great injustice is done to him, because the brewer, by holding off, cheapens the price of the made commodity, and at the same time takes a buyer out of the market. He reduces the price of the article which he is purchasing, and takes a competitor out of the market

1839. I suppose that there are very few independent maltsters now?—Very few; there are a great many maltsters who make independently of the brewer, but they are dependent on him for the consumption of their malt.

1840. Are there any maltsters in no way dependent upon the brewers?—There are a few certainly who are independent of the brewers. I am not a maltster, but I can only tell you the impression of the farmers as to the way in which the tax operates.

1841. What do you think that the farmer would gain by a reduction of the duty?—He would gain a more general sale for his produce, and a more equable price. The price of course would still depend upon supply and demand, the same as it does now, or has done heretofore, and also of course upon the article that he had to sell.

1842. And he would be able to sell his inferior barleys of course at a better price?—He would be able to sell them or to use them himself, and to be independent of the maltster, by using them for his own purposes instead of bringing them to market.

1843. I think you said that you had no substitute at all that you could offer for the consideration of the Committee, to supply the place of the malt tax?—I did say that the farmer might be taxed according to his occupation, or the brewer taxed according to the size of his copper.

1844. Mr. *Hunt.*] I understand you to say that you prefer having the tax put upon beer, because you would be able then to use your produce any way you liked?—I did say so.

1845. In fact, your preference for a beer tax over a malt tax, hinges upon your being able to use your barley for feeding cattle?—Not entirely; I think that we should have more customers in the market.

1846. Supposing that you were allowed to germinate your barley for the feeding of your cattle, without any inconvenient restrictions, should you then prefer the tax being upon beer?—Decidedly; it would be a partial boon, but not what we want.

1847. You think that if there were a beer tax instead of a malt tax, drunkenness would diminish?—I am sure that as the price of the article used was diminished, the quality of the beer would be improved.

1848. Do you think that people would brew more generally in their own homes?—I think it would be a work of time, but that it would come to that in the end.

1849. How do you think that a beer tax could be levied?—I am not giving evidence upon that point in any way, if you will excuse me. I should think however that it might be easily done by a licensing system.

1850. There would then be a necessity for a domiciliary

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domiciliary visit to every house where beer was made ?—I do not think that any exciseman would want to visit a cottage ; the quantity would be so small.

1851. You would contemplate then that where beer was brewed in small quantities, there should be no duty paid ?—Yes.

1852. Do you think that the British public would stand the exciseman coming to private houses to inspect the quantity of beer brewed ?—I think that there would be no necessity for it; I would have a license.

1853. You would have a brewing license, you mean ?—Yes, and I would make the man declare the quantity of malt he had, and where he bought it.

1854. Would you have a graduated license, according to the capacity of the vessels used ?—Yes, according to the capacity of the vessels used, or according to the acreage of the farm.

1855. You would require domiciliary visits from the exciseman to gauge the capacity of the vessels, would you not ?—Say once a year. No alteration could take place on the farm premises.

1856. There might be alteration ?—It would be possible, but not probable.

1857. It would be necessary for the exciseman to come to see that there was no alteration, would it not ?—Let him come once a year, that would be enough.

1858. You would propose that in the case of every house in the kingdom (except mere cottages) where beer was brewed, a license should be taken out ?—That of course would depend upon the Government, in a great measure ; but I would make every man certify the quantity of malt which he brewed, and where he bought it ; and that would be a great protection.

1859. Do you think the public would stand that interference ?—We are obliged to stand a great deal of interference now, that is certain.

1860. The exciseman does not interfere with you ?—He prevents our using our commodity in the way we like.

1861. He does not pay a visit to your copper ?—No.

1862. Do you think that the British public would stand domiciliary visits from the exciseman ?—I do not see the necessity for it.

1863. Who do you consider pays the malt tax now ?—I consider that the farmers, in a great degree, pay it ; it is a tax upon land and the landowner.

1864. Do not you think that the beer drinkers pay the greatest part of it ?—No, I do not.

1865. You say that the malt tax raises the price of beer to the consumer ?—Yes.

1866. And that if the malt tax were removed, beer would be cheaper ?—Better.

1867. You do not think that it would be cheaper then ?—I do not think it will be much cheaper ; a halfpenny a pint, perhaps. If you repeal the malt tax, and establish a greater number of breweries or maltsters, you will have a greater amount of good beer than at present.

1868. Is it your deliberate opinion that the barley grower, and not the beer drinker, pays the malt tax ?—The tax is a very serious tax upon the barley grower ; as to the paying, of course it comes upon the consumer in the end, but the farmer is injured by it.

1869. The consumer pays in the end, does he not ?—To a certain extent, he does.

1870. *Chairman.*] But supposing that the consumer does pay in the end, that is no reason why it should not be a serious injury to the farmer previously, is it ?—Certainly not ; the injury is sustained before that takes place.

1871. Sir *E. M. Buller.*] Is it not the case that every tax will fall upon two parties, the producer and the consumer ?—I suppose it must.

1872. Colonel *Duncombe.*] I suppose you have not considered the question how a tax on beer might be levied ; that has not entered into your consideration ? — No ; the drawback now upon malt is a very serious item, that is to say, the amount paid as drawback by the Government on malt for export is great, and with a beer tax there would not be that drawback.

1873. I understand even if the tax upon beer necessitated the visit of the exciseman, you think that it would be a preferable tax to that upon malt ?—Yes.

1874. Do you consider beer a necessary beverage for the farm labourer ?—I do.

1875. Is there any substitute for it ?—I do not think so.

1876. Could you get as much work out of men if they drank tea or coffee ?—No ; the labour in the corn harvest is so great ; the dust causes excessive thirst, and the heat and the strain of work is very great.

1877. Of course, as they undergo excessive thirst, they are obliged in the present case to take a considerable quantity of beer to the fields to drink ?—Yes, they do.

1878. And that beer is very frequently got from public-houses ?—Not in harvest, we supply it then.

1879. As to the beer they drink at their own homes, is that got from public-houses, or not ?—Yes.

1880. In ordinary times I mean ? — Yes, in ordinary times.

1881. And do their families partake of beer ?—I imagine that that is more frequent on the Sunday than on any other day ; I see constantly jugs going from the public-house to cottage homes on the Sunday evening, but seldom on other days.

1882. If they were able to brew pure beer at their own homes, they would be a more useful class of men than they are at present, you think ?—Yes, no doubt about it.

1883. And it would tend also to the morality of the country ?—Decidedly.

1884. Have you yourself tried Mr. Gladstone's mixture ?—I have tried several tons of it.

1885. And it cost you 11 *l.* or 12 *l.* per ton, you said ?—Yes.

1886. Did that include the carriage ?—Yes ; I think that it was delivered into my station about two or three miles from me.

1887. That was a price which precluded the farmer from using it ?—Yes.

1888. Mr. *Read.*] Where was that made ?—I should say at Stowmarket ; it was at some place in Suffolk.

1889. Major *Parker.*] Did I rightly understand you to say that you brew for your own farm labourers ?—Yes.

1890. Do you put out your harvest ?—Yes.

1891. What quality of beer do you brew for the harvest ?—About 63 gallons to the quarter.

1892. What quantity of that description of beer do you allow to each man at harvest ?—Two quarts a day of that, and two quarts of a beer not quite so strong as that, which contains about two bushels to the 63 gallons; it is half the strength, making very fine bitter beer. It is brewed in January, and is very nice indeed to look at.

1893. When you speak of the 63 gallons to the quarter, is that inferior beer included in that?—No; they are brewed quite separately, and at different periods of the year.

1894. Then what do you estimate in your own cost as the value of two quarts of good beer, such as is brewed when you have 63 gallons to the quarter?—A penny a pint.

1895. And the value of the other description of beer?—That is half the strength; a halfpenny a pint would be the cost.

1896. May I inquire what amount of work each man would do?—The quantity of work will be 10 to 12 acres for the harvest, according to the kind of work; our wheat is reaped by the acre.

1897. That figure includes wheat?—Wheat, barley, and oats, 10 to 12 acres.

1898. Mr. *Henry Surtees.*] To what extent do you consider that the malt duty is a tax upon your farm, in respect of the beer required for consumption on your farm?—I should say, as nearly as possible, a shilling an acre for arable and pasture land over ninepence.

1899. You farm between 1,800 and 1,900 acres?—Yes.

1900. Mr. *Ayrton.*] Will you state the process by which you arrive at that shilling?—By taking the quantity of malt I brew.

1901. Mr. *Lefevre.*] The quantity of malt which you now brew that is to say?—The quantity of malt which I now brew.

1902. Mr. *Ayrton.*] What you mean is this; that assuming you brew for your labourers, and give them beer instead of wages, then the money that you would pay in duty upon the malt used in that beer would be equivalent to a shilling an acre?—It must be remembered that the beer given in lieu of wages would be very partial; it might be reckoned in harvest, but not in other seasons of the year. Our men have small beer to go to at all seasons of the year, but, independently of that, they have ale perfectly free from any limitation as to wages on certain work. But in harvest it would of course go in reduction of wages, because if I did not give beer I should give two shillings an acre more.

1903. Mr. *Henry Surtees.*] Do you consider that the malt-tax tends to cause a monopoly to the maltsters?—No question of it.

1904. And does it also cause a monopoly to the brewers?—Decidedly; more than to the maltsters.

1905. Can you form any estimate as to the extent to which that monopoly affects the price of barley?—I cannot; I know we are injured by it, in consequence of the want of competition.

1906. Mr. *Read.*] Your men, I suppose, would not work without beer?—I believe that our corn would not be got in without beer; that is my impression.

1907. If your were to give them money instead of beer, would they spend that money in beer?—They do.

1908. They buy it from public-houses?—They do; I have two off-hand farms where the men have been, that beer is ordered in a small cask from the brewer, and I am responsible for the payment of that beer.

1909. You give the best beer on piece work in harvest time?—Yes.

1910. And you say, I think, that you give a certain amount of small beer also?—Small beer all the year through, and that is made, as I stated to Major Parker, after the other 63-gallon crop is taken; that is taken as another separate wort, and the men have free liberty to go to that as they please.

1911. Do you think that if the malt tax were repealed, it would be a benefit to the barley grower?—Yes.

1912. Would you grow more acres of barley?—Decidedly; I should not on my light land, but on my mixed land I should decidedly.

1913. Even if there was a beer duty it would help the growers of the lower class of barley?—No doubt of it.

1914. What has been the effect of the free-trade measures of the last 20 years on good pasture land?—None whatever, because the labour employed on those lands has been so exceedingly small that there has been no diminution of their value in any way.

1915. They have not been injured at all by the free-trade measures?—I do not think so; the population of the kingdom, I think, has kept them right.

1916. Do you mean that their produce is enhanced in value?—Yes.

1917. And their expenses have not increased?—No.

1918. What has been the effect of free trade upon arable land?—It has caused some of the poorer lands to be abandoned and laid down to pasture.

1919. Have the expenses on arable land increased?—No doubt of it, the labour has increased within 10 years, at least 30 per cent.; and another thing, our men are, of course, as men are in all other positions of life, a little more independent, and we do not get the same amount of work done, and therefore the estimation of 30 per cent. increase in the expenses would not be at all equivalent to what it costs us.

1920. It would, in fact, be more than 30 per cent. per acre?—Decidedly.

1921. Taking the average of years, the price of corn has been less considerably than it was?—It has; last year was an exceptional year in consequence of the bad weather, and the short crops in many districts.

1922. What is the effect of putting down light land to grass?—The effect of it is, that it does not produce in the first place anything like so much food, in point of meat, to the consumer, and, of course, all the corn that was grown upon that land is lost; the expenses are lessened on it certainly, but you are aware that a farm grown on the four-course system would feed far more sheep than it would in a grass state; a green crop alternately would feed a large quantity of animals, and produce food to the public.

1923. So that in the case of that laid down to pasture, there is a loss to the public of all the corn and a certain quantity of meat?—Yes.

1924. Unless corn is tolerably remunerative, such land goes out of cultivation?—That has been the cause of its going out of cultivation.

1925. Mr. *Ayrton.*] You spoke about brewing by license; what is your idea of the mode in which

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which the license would be granted; how would the amount of the license be calculated?—I really have no idea on that point; you would go, I suppose, to the consumption of the country, and see what was the amount probably consumed, and then take what it would be on every quarter.

1926. But how would the license be regulated in accordance with the quantity of beer brewed?—The person should make a return of the quantity of malt he purchased.

1927. And then you would average the quantity of malt he consumed?—Yes.

1928. You think that the best way?—I do not know: I have really no plan for it; I think that some plan could be devised; I think it might be on the quantity of malt used, let a man use it as he likes.

1929. Then the difficulty that has been stated here that the malt duty depreciates the value of the second qualities of barley would not be in the least obviated, would it?—Yes; I think it would, because a man would buy it at a cheaper price, the price of the inferior malt would be more reduced than it is now.

1930. Would it not be precisely the same thing whether there was a tax upon the malt or whether there was a tax upon the license, regulated by the quantity of malt; as regards the valuable and profitable use of malt, would it not be exactly the same thing?—No; I imagine it would not.

1931. How do you make out any difference; we have been told that by having a duty upon malt, if the malt is of an inferior quality for the purpose of making beer, it is unduly depreciated in value?—I should answer that question in this way: by making the duty payable on the license instead of the malt tax, you do away with all the surveillance of the excise and all the restrictions.

1932. But as regards the question that has been stated, it would make no difference, I suppose?—It would make great difference in the feeling of people towards it.

1933. But as regards the effect of the malt duty, or supposed effect, in depreciating the value of inferior qualities of barley, it would make no difference?—There would be no necessity for any drawback, and no occasion for any excise regulations respecting the making of malt, and that, I think, would be a great boon.

1934. I am speaking of the specific difficulty which has been stated, that the malt tax depreciates the value of the stained barley?—It would make this difference; that we should use a greater quantity of barley for other purposes, and less would come into the market; and we should be benefitted, and you would get rid of the drawback and of a great deal of nuisance.

1935. Do you think that it would be quite possible in farm houses, to levy a duty upon beer, having regard to the quantity of beer made?—I see no objection to that; but it would be objectionable on this ground, that there would be an end of beer being given to promote good feeling between master and men.

1936. Considering that two bushels of malt seem to make any quantity of beer, from a barrel up to two barrels, would it be fair to tax all beer alike, though not of the same strength?—In the same way with the brewers, you would find that their treble X would not be of the same strength.

1937. Would you not think it a great injustice, when brewing this extremely light beer for the workman, to pay the same duty upon it as was paid on strong ale?—It could not be levied by the gallon. I want to do away with the necessity of any levying. It might be done either by a house tax, as suggested by the honourable Chairman, or in some other way.

1938. That would be altogether abolishing the duty?—Yes.

1939. But I am anxious to get from you whether you see any mode by which a duty could be levied on beer brewed by farmers, and if so, whether it must be on the quantity of malt used, or, if not, that whether there can be any other mode suggested?—I think that the quantity of malt would be the safest test.

1940. Major *Parker.*] Should a house duty be charged, do you think?—I say that I should be very pleased if that could be done instead.

1941. Mr. *Ayrton.*] That would not be a duty upon beer at all?—Certainly not; that would be getting rid of the restrictions altogether.

1942. You mean a different duty altogether, one not connected with beer or malt?—Not connected with beer or malt.

1943. Is growing barley a very unprofitable occupation?—It depends upon the price.

1944. As compared with growing wheat, for instance?—Barley is grown in rotation with other crops, and of course it is for the benefit of the farmer to vary his crops.

1945. But in reference to other things that he grows, does he find it profitable or unprofitable to grow barley?—It depends upon the relative price, supply and demand. If we get a small quantity of barley the demand is great, and the price rises, as last year.

1946. Is there anything peculiarly unprofitable in growing barley, or is it as profitable to grow barley as anything else?—It depends upon the whole return; a farmer does not analyse the returns on his crops, but we know that the barley ought to yield us a certain amount.

1947. Do you find any indisposition to cultivate barley because it is less profitable than other commodities?—It depends upon the soil and the mode of cultivation entirely, whether it is less profitable.

1948. Are you able to say that there is any positive difficulty, from the want of a profit, in growing barley?—It must depend upon the cropping and cultivation, the same as with all other crops.

1949. Then it would not seem that the malt duty has any effect upon the cultivation of barley; it does not depreciate your profits as a farmer?—Only in the price received for it and in the want of customers, which we find in every market at certain seasons of the year.

1950. You do not find that that want of customers came from the malt duty, do you?—Yes, entirely so.

1951. In what way?—A maltster is obliged to have one-third and frequently two-fifths more capital to carry on his trade. The brewer either imagines that he does not want the malt or tells him that he does not. That depresses in the first instance the price of malt, and at the same time drives a customer for our barley out of the market.

1952. Do you find, as a matter of fact, that the maltster

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maltster is unable to buy the barley on account of want of means?—Most decidedly. Men of limited means, after they have paid the duty, must sell, and if the brewer does not choose to buy, then of course he is kept off the market.

1953. We understand, then, that in your market there is a difficulty in selling barley, on account of want of means in the buyers?—We always find that, after a certain period, when the maltster has advanced capital for barley and has got to pay the Government duty, he becomes from a necessity a very careless buyer. The brewer is well contented with the malt tax and with the present licensing system, because he is practically workng with the Government money. The maltster is the first person shut out; he buys the barley and pays the duty.

1954. The credits formerly were much longer than they are now?—They were.

1955. Did you find then, that there was a less difficulty in selling barley, on account of a want of buyers in the market?—The shortening of the credits has, to a certain extent, drawn buyers off the market.

1956. You think that that has been sensibly felt in the market, do you?—Yes, a great many have withdrawn from the trade.

1957. Do you think that that is one of the principal reasons of the business having been abandoned by many smaller maltsters and concentrated in the hands of a few larger maltsters?—That has acted partially; the difficulty of dealing with the credits and the difficulty of finding a customer when the malt was made; in fact, the capital required for it.

1958. Do you think that if the credits were brought back to the former standard that would obviate the evil?—It would have a certain benefit, but not relieve us from the difficulty of the measure.

1959. Mr. *Hardcastle.*] You said, I think, that the maltster had to pay the malt duty before the malt was well off the floor. Is that the case?—I think so.

1960. We have have had evidence from Mr. Stephenson to the effect that a maltster who gives a bond, has six weeks' credit?—Yes, if he has to pay. Suppose I began to make, say, on the 1st of October, the duty, unless I give bond, must be paid on or about the 25th of November. It would be made up to the 15th of November, and part would be upon the floors undried off on the duty day.

1961. The question I asked you was, whether, supposing he gave a bond, he would have six weeks' credit?—Suppose I give bond, the duty must be paid six or seven weeks after the payment in November. The great evil is the monopoly of those men who are employed by the brewers to make malt for them, the brewers finding money, and the man who makes upon his own account is compelled to place his malt in these men's hands to sell to their employers.

1962. Then, practically, the malt that is made up to the middle of November, has no duty payable upon it until the end of January, has it?—Six weeks is the time; it is paid in November, and then paid every six weeks after, but if a man gives bond, he gets 14 weeks' credit.

1963. Does not that give him plenty of time to sell his malt?—No, it does not; a brewer often takes from three to four months' credit after it is sold. There is the credit upon the cost price of the barley, and also the credit upon the money actually paid out of the maltster's pocket in the way of duty; that is how it acts.

1964. But, on the other hand, the maltster has the opportunity of selling his malt before the duty is payable upon it, and in that case, if he sells for cash, he gets the benefit?—If he sells for cash, he sells at a disadvantage. And then the brewer who makes malt has this advantage over him, that before he has paid the duty upon that malt, he can put it into his copper, and send it to his customers as beer, and very frequently have that money back into his own pocket, while the maltster has to stop for weeks before he can get his return, not only upon the cost of the barley, but upon the duty which he has paid to the Government.

1965. I think you said that you thought the demand for the article would be constant?—Yes.

1966. Do you mean that you have not demand in the summer as well as the winter, now?—We have none to sell, except in the winter months; we have a large demand for barley probably up to Christmas. The maltster then has expended his capital; the brewer has been having his own malt, and making a profit out of it, but the maltster cannot sell at a proper profit. If he sells for money, he has to sell at a heavy discount. All these things detract from the profit of the maltster, and make him exceedingly careless, in fact, and it is impossible for him to buy; he cannot go on in that busy way that he did previously.

1967. Do not you think that it is generally the custom of maltsters that they attend a certain market, and have certain persons from whom they buy, and do not they buy from week to week?—Generally speaking they do, but there are certain times when the malt is not sold, and then, "I can be no buyer," is what they say.

1968. That only perhaps proves the maltster goes into his trade without sufficient capital, does it not?—No, but that the capital required is much enhanced by the tax.

1969. You said, I think, that you proposed some system of license?—I beg your pardon, I do not propose that; I only alluded to it.

1970. Are you aware that when Mr. Gladstone substituted a brewing license for the hop duty, he proposed in the first instance to extend that license to private brewing, and there was such an outcry against it at the time that he was compelled to abandon that?—Yes.

1971. Mr. *Dent.*] You give your men free run to the beer cask all the year through, as I understand you?—To the small beer.

1972. Is that the custom generally in the eastern counties?—That is the custom generally in the eastern counties, or to pay 1 *s.* a week for that; that is the only amount that goes with us in part payment of wages.

1973. You say that the men prefer this run to the beer cask to 1 *s.* a week?—Yes.

1974. You have not much grass land in your district?—No.

1975. Therefore the men have no milk?—No; our ploughmen have milk for breakfast; there is very little grass about the cottages; but milk is sold constantly in the villages by several little farmers.

1976. I could not quite understand one statement you made; you said that beer was not given

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given in lieu of wages; but surely at all seasons of the year when you give it, it must go in lieu of wages?—It does not, I assure you. In the present scarcity of labour, and the trouble of the labour question, it is well for a farmer to stand well with his men, and if I were wishing to do so, I should give the men a couple of pints of beer, not at all in lieu of wages, but to promote good feeling. The small beer is in lieu of wages.

1977. But if every farmer gives beer, it is money's worth that he is giving the men?—No, not so at all.

1978. Would you get them if you did not give them the extra beer?—No doubt.

1979. Then why do you give it?—Because we like to stand well with our men, and we know that they want it.

1980. You are putting it to us that you have a tax of 1 *s.* an acre for beer. It is a gratuity which you give to your men in lieu of wages?—No, we give it in harvest time, in lieu of wages.

1981. But the other also must be money's worth?—Decidedly not.

1982. You have told us a good deal about the expenses of labour on a farm in the present day, and how much they have increased, and yet you say that you give your men gratuitously as much beer as they like, although you could get them to come without?—Not as much as they like; I say that if our men were hoeing turnips they would have one pint of beer per day extra.

1983. Lord *Eustace Cecil.*] You look upon it merely as a douceur, not as a wage?—Yes.

1984. Mr. *Dent.*] You are arguing that the tax you pay on beer is a tax upon your farm?—A tax on the quantity of malt I brew.

1985. And yet you are not obliged to give it in certain cases?—I say that in harvest it goes as a reduction of wage.

1986. About land being put down to grass and going out of cultivation, do you say that that has been done to any great extent?—Not to a great extent, but it has been done on the lighter soils in Norfolk.

1987. Has the rental of farms in Norfolk decreased?—I think that it would be a question for the farmer whether he lost less by cultivating it or by laying it down; it is not a question for landlords, I apprehend.

1988. As a rule, you must be aware that the rental of land in England has certainly not been decreasing lately?—Certainly not.

1989. And that the tendency has not been to lay down land to grass which was at all fitted for arable purposes?—No, but land has been laid down in that way; near me 500 acres were laid down in that way.

1990. You, as a practical farmer, say that you could produce more meat on this land if it were not laid down?—More meat without the corn, and the corn is lost to the consumer.

1991. Which has been paying best the last few years, meat or corn?—Meat, decidedly; but with profitable farming they should both go together.

1992. How do you reconcile that statement with the statement that farmers find it better to lay land down to grass?—A man argues in this way; this land, properly laid down, requires less labour and less capital, and the produce of that, carried off to other parts of the farm, would probably improve them.

1993. Can you give us an approximate quantity of land that has been laid down to grass under these conditions?—No, I cannot: I do not think that it has been to any great extent.

1994. What counties has it been done in?—It has been done in Norfolk; it was done close to me some years ago.

1995. What quantity?—Four or five hundred acres.

1996. How many years ago?—I dare say more than 20 years ago. It is want of energy on the part of the farmer that leads to it in some cases, and in some cases it is from his really feeling that his labour and his capital would be so much reduced by laying his land down, that he would be a less loser by so doing than by cultivating it in the ordinary manner, sowing four crops.

1997. The fact is, that on land of that description, to work it successfully and at a profit, you want capital?—Yes; no doubt of it.

1998. And it has been where men have thought that they could save money, that land has been laid down in the way you describe?—They have thought that they would lose less rather than more.

1999. Has the malt tax had anything to do with that?—I do not know that it has, any more than any other tax, or free trade altogether. The cropping on that land would generally be of a thin inferior quality of barley, and not adapted to make malt; that is what I should say.

2000. Mr. *Hardcastle.*] Where is this land you have just spoken of?—Duxford and Crishall, on Lord Dacre's and the Rev. E. Fisher's estate.

2001. Part of Royston Downs?—No, Royston Downs is 10 miles from that.

2002. Mr. *Dent.*] Thousands of acres of down land have been broken up within the last 20 years in the south of England?—Down land, properly broken up, would grow plenty of corn, but this land which I speak of, when laid down, had been worn out from corn.

2003. *Chairman.*] Of course there are exceptions to every rule, but taking it as a general rule, so far as you know, it has been the heavy land that has been laid down in grass; stiff clay land, which would not produce, except by a very heavy expenditure, wheat crops, has been laid down?—No, I think there is very little heavy land laid down in grass; it has generally been the lighter soils.

2004. Then it is your opinion that certain light lands have been laid down in grass?—That has been so, but not to a great extent.

2005. As a practical farmer, you would say that it would pay better to cultivate the light land, let it be ever so light, upon the four-course system, than to lay that light land down in grass?—Far better for the community at large; whether it is better for the occupier or not, would depend upon seasons.

2006. I should like to have your practical experience on that point, with regard to the occupier?—As an occupier, if land were ever so poor, I should hesitate before I laid it down in grass.

2007. But if you did lay it down in grass, should you not think as a farmer that the light land would be better to cultivate than the heavy clay land?—Yes.

2008. This heavy land which has been laid down, was laid down for breeding purposes?—For breeding and grazing purposes.

2009. It did not pay to grow wheat crops upon, and

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and it was found to rear a large quantity of cattle, and that was the reason it was laid down?—That was the reason of the occupier; he would lose less by it in a state of grass than in a state of corn.

2010. The lighter land on the four-course system, even with the malt tax on, pays better to cultivate for barley than the heavy land would, with the malt tax on?—The quality of barley produced on the light land would be far more saleable for malt than the other, no doubt.

2011. I will go one step further. Mr. Ayrton put a great many questions to you upon that point; and what I want to know is this, whether it is not your heavy land upon which the crop of barley is precarious, which you have thrown out of barley cultivation, and get a crop of wheat upon, instead of a crop of barley?—Yes, most decidedly so; the barley is not so well adapted for malt.

2012. Therefore as there is a large quantity of stiff clay land, or of clay land throughout England, supposing that the malt tax were taken off, that land would grow a certain proportion of barley in its course, whether it was the six-course system, or whatever other course it might be?—No question. A crop of barley would be frequently taken instead of a crop of wheat.

2013. And that would benefit the land and also benefit the farmers?—We imagine so, because rotation of crops is always considered by us to be right.

2014. Sir *E. M. Buller.*] You have told us that occasionally your labourers purchase beer from the brewer in small casks?—That is in harvest, where money is given in lieu of beer.

2015. Do you know what price they pay for it?—I cannot say.

2016. I thought you told us you were responsible for it, and paid for it yourself?—Yes, I am responsible in the event of the men not paying; I think it would be 6 *d.* and 1 *s.* (they have two sorts), one of the honourable Members of the Committee says 10 *d.*

2017. As far as you know, what is the price they pay when they purchase their own beer?—When they purchase their own beer in casks, I thought it was a shilling a gallon.

2018. That is very much stronger than your beer?—No, it is not at all better; I think the brewer would take four barrels where I should take three-and-a-half.

2019. Do you mean that the brewer charges a shilling a gallon to your labourers, for beer not at all stronger or better than that which you brew at 8 *d.* a gallon?—Certainly no better.

2020. A shilling a gallon would be 3 *d.* a quart, and your beer only costs 2 *d.* a quart?—Yes.

2021. That beer from the brewers is very good, is it not?—I think it varies, the same as all other beer.

2022. Do you find that it has the same effect upon the men as public-house beer?—I think that, to a great extent, it has not; it is modified in its influence.

2023. Does it produce the stupifying effect upon the labourers that public-house beer does?—It acts in this way; a man knows that he has only a certain quantity to have, and that that has got to last the harvest out, and therefore he does not drink to the same extent.

2024. You do not say that this beer of the brewer is much better than the beer of the public-house?—I have no knowledge of that.

2025. You say that if you had the malt tax repealed, your beer would only cost you 1½ *d.* a quart?—No; I say that it would cost 5¼ *d.* per gallon, supposing the malt tax were repealed.

2026. Did not you tell us that it would be 63 gallons at 28 *s.*?—Yes.

2027. If you brewed 63 gallons for 28 *s.*, as you told us, surely that is not more than 1½ *d.* a quart; 6 *d.* a gallon?—It is under 6 *d.* a gallon.

2028. That costs less than 1½ *d.* a quart, you say; if it costs less than 1½ *d.* a quart, the difference to you in brewing, between the existence of the malt tax and the non-existence of the malt tax is one halfpenny per quart, or exactly one-fourth?—It is more than that; the duty on malt raises the natural price from 5¼ *d.* to 8 *d.* a gallon.

2029. It now costs you less than 2 *d.* a quart to brew 63 gallons, does it not; if the price is 42 *s.*, as you say, that brings it out something less than 2 *d.* a quart?—Exactly 2 *d.* a quart.

2030. But you could brew in the other case at less than 1½ *d.* a quart, therefore the malt tax makes the difference in the price of your ale of one halfpenny out of 2 *d.*?—Twenty-five per cent. that would be; it makes more difference than that; it makes nearly 30 per cent. difference.

2031. The least effect produced, then, by the malt tax is to raise the price of beer one-fourth?—It raises it 30 per cent., as near as possible.

2032. According to that the consumer, where he pays now 4 *d.*, would pay only 3 *d.*?—It would depend upon whether the brewer could get the extra profit, or whether the maltster could get the extra profit.

2033. But you could do it yourself at that much less?—Most decidedly.

2034. That is the effect of it; and if that be the effect, that it enables you to brew for three-fourths of what you expended formerly, of course the brewer could do the same?—No doubt.

2035. You tell me that this beer supplied by by the brewer is sold at a shilling?—I am not positive on that point; it would vary from 10 *d.* to a shilling.

2036. If the consumer got his fair share of the remission of duty it would really reduce the price of beer one-fourth?—At least that.

2037. Mr. *Laing.*] Is it the general practice to give malt to the labourers at harvest-time?—It is not the general practice in our neighbourhood, but there are a good many farms at a distance from the farmhouses, that is to say, separate occupations added to farms, and it would be very inconvenient for them to have to come a mile and a-half or two miles for beer; and, therefore, the farmer's man having enough to do at that season of the year, money is given or malt is given to the labourers instead; where money is given they always have place near at hand where they can go and buy beer for their consumption during the harvest months.

2038. Supposing that a beer tax were substituted for the malt tax, and that that beer tax were under excise regulations (which necessarily it must be) which made it difficult or impossible to brew on a small scale, that would stop the practice prevailing now, would it not?—I can scarcely imagine excise regulations being so strict as to prevent that.

2039. Do you think that the effect would be that

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that the farmer would brew for his labourers?—I think that the brewing for the labourers is the rule; the giving of malt and of beer is the exception; the men much prefer the former plan, for this reason, that they get their beer regularly sent in to the harvest field, and it comes cool from the farmer's cellars, whereas if they carried it about with them it becomes hot and unhealthy.

2040. At present the mode of levying the malt tax has this advantage, has it not, that when once the malt tax is paid, there is no longer any impediment in the way of using it?—No, the impediment comes first by the maltster requiring one-third more capital, and frequently two-fifths, and the farmer is not allowed to do what he likes with his produce.

2041. Supposing the amount is the same, you would rather run the risk of inconvenience in having it put on the beer than have it put in the first instance on the malt?—I think that, as a general rule, the farmer would be exceedingly glad to get rid of the malt tax. What substitution would be best for him, or the country?—I cannot say.

2042. Is this the advantage that you expect from it; supposing that the same duty were put on the article, but at a later stage, namely, as beer, instead of at the earlier stage of malt, you think that the interest on that capital would be saved?—Yes, the interest on that capital would be saved; that is why the maltster requires a greater capital at present.

2043. You think that that would lead to a greater demand, and a better price for barley?—Yes.

2044. Lord *Eustace Cecil.*] And that it would react most decidedly in favour of the farmer?—It must do so.

2045. Which would you prefer personally to have, the repeal of the malt tax, and to have the visits of the exciseman, supposing you brewed beer, or no repeal at all?—I would far rather have the visits of the exciseman.

2046. Colonel *Duncombe.*] Is it the universal practice to give men beer in your neighbourhood?—Yes, universal; when I say "universal," there are some exceptions.

2047. Is it not then really a question of wages?—No, some men do not give half the beer that others do. It is a wage question as far as the small beer in lieu of 1 *s.* a week goes. Beyond that it is not a wage question except in harvest.

2048. Major *Parker.*] It has been said that when labourers brew beer for themselves they brew it of two or three quantities, taking the milder quality earlier in the day, and a stronger as the day and the labour advances. Would it not be a very great hardship to labourers that they should be necessitated to take brewers beer all of one quality, at 1 *s.* a gallon?—They do not take it so; I said that the men usually had two qualities; two or three men would club together, and order two different qualities of beer, some of the milder beer, and some of the stronger. Our men do the same with the small beer, which I speak of; the men take half-a-pint of that first, and a pint of strong beer afterwards. That is their custom after having pitched a lot of corn.

2049. Mr. *Ayrton.*] The weaker it is the wholesomer it is, is it not?—I would not say so.

2050. Major *Parker.*] You have spoken of the brewers' ale at 1 *s.* a gallon; what value is the inferior kind that they make now, I mean that which is got from the brewer?—I should say that they would get nothing under 6 *d.* a gallon; that would be about the price they would pay. The brewer has to find casks, and of course the casks may be injured.

2051. Mr. *Henry Surtees.*] If the brewer charges you 1 *s.* per gallon for beer of a similar quality to what you can brew for 8 *d.* per gallon, would not that be a difference of 33 per cent.?—When barley is low, it is increased one-third at least by the duty.

2052. Is it not the case that in some counties we cannot grow the best qualities of barley, and that, therefore, barley is not grown at present to the extent that it would be if the duty were repealed?—Yes.

2053. And wheat is grown instead as the result?—Yes.

2054. Mr. *Read.*] The honourable Member for Scarborough asked you whether it did not pay better to produce meat than corn?—The man who farms most successfully must produce both corn and meat.

2055. Is not the production of meat from grass very much cheaper than producing it on arable and cultivated land?—Yes, because it is almost entirely without labour.

2056. There is no expense except rent in production of meat from grass?—Rent, rates, and tithes.

2057. Whereas, on the other hand, you cannot raise a considerable quantity of meat from arable cultivation without extra expense and labour?—Yes.

2058. And rent and labour have increased much in the last 20 years?—Yes.

2059. Have you much piece-work except at harvest times?—Yes, almost the whole year through.

2060. Supposing that you put out, say, your turnip hoeing, at so much per acre, do you always agree to pay the men so much per acre and a certain amount of beer?—No, certainly not; it is a gift entirely; if I go to them and find that they are working well, I say they may have it; it is an inducement to make them do their work, and stick to their work.

2061. Mr. *Ayrton.*] Does it not add to the general expense of wages?—No; it is done because it is a benefit to get the work done.

2062. Sir *E. M. Buller.*] If you do not give the beer, the men dislike their work and it is slighted?—I do not say that; I should very likely find fault with them.

2063. Mr. *Ayrton.*] You say that if the malt duty were repealed, it would lead to a considerable increase of production of barley from heavy soils?—I take three wheat crops alternately on my heavy land; I should take probably one barley crop, and sometimes two, if the tax were repealed.

2064. Will you explain why the repeal of the malt duty would lead to that result?—Because I should be enabled to use the coarser quality of barley, which I might grow for my stock if it were unsaleable, and have more customers on the market to buy it.

2065. But if it were unsaleable, you would not get more people to buy it?—I mean unsaleable with the malt tax upon it for the purpose of malt; I do not mean entirely unsaleable, because

cause we know of no such thing, but still depreciated; then, I should have more customers for it in consequence of there being a greater demand for beer being made with more malt in it; if malt were two-thirds of the price, I imagine that every person would feel inclined to make an article as good as he could, and would use malt instead of sugar.

2066. Is it your impression that if the malt tax were repealed, then in consequence of the increased demand for barley, there would be a rise in the price of barley?—It would depend upon the supply from abroad, and the home supply, and demand must regulate price always.

2067. That is a speculative opinion then?—Still we know that a certainty of customers gives a satisfactory price.

2068. Have you not stated that that is a matter of uncertainty?—No, there would then be a certainty of customers.

2069. Do you think that if the malt tax were repealed there would be a greater amount of barley grown?—Yes; in the first place what was unsaleable we should use for ourselves in a saccharised state, and in the second place we should have more customers to buy what was left.

2070. I want you to distinguish between the value of barley for saccharisation and the value of it for the market?—The value to us of it for saccharisation would be regulated by the price of beans.

2071. Do you think that if the malt duty were repealed there would be any greater sale off a farm of the barley grown upon the land, than there is now?—There would be a constant demand for it, because the farmer who wanted it for saccharisation would come and buy of us; it would be cheaper to him

2072. You think that those people who could grow a superior quality of barley, would be disposed to buy the inferior quality grown on the heavy land for the purpose of saccharising it, and using it for feeding purposes on their farms?—I do.

2073. And in that way there would be a greater demand for the inferior quality of barley grown on heavy land?—Yes, and a greater certainty of customers.

2074 Do you see any one particular demand that would grow up beyond that for the process of saccharisation consequent upon the repeal of the malt duty?—I do, the general demand for brewing purposes.

2075. Do you consider that the barley grown upon the the heavy land is, at present, not fit for malting?—Part of it is, but a great portion of it is not.

2076. That part which is not you have disposed of by saying that it would be used for feeding purposes?—And malting purposes too, because that barley would be malted without tax.

2077. What do you consider would be the percentage probably of the malt; in other words, what portion of the barley would be so produced that it would be unfit for malting purposes, and fit only for feeding purposes?—It depends upon the district where it is grown. In the district where I live the whole of our barley goes for malting purposes, but on the other farm which I farm, not one-third of it goes to malting purposes.

2078. *The O'Conor Don.*] How much of this better beer of which you have spoken do you give to your labourers?—From one pint to three pints, according to the work done.

2079. What is the cost of it?—Penny per pint to brew it costs me.

2080. Supposing that you give three pints a day, that is 18 pints a week, and that is 1 *s.* 6 *d.* a week; you give them, in fact, 1 *s.* 6 *d.* worth of beer a week?—Yes.

2081. You give them that, in addition to the ordinary wages which they would otherwise get in consideration of their giving you better work for it?—Yes.

2082. What difference is there between that and more wages?—Very great. I wish the work to be done properly, and higher wages might or might not insure that, whereas this does insure it.

2083. This addition of 1 *s.* 6 *d.* worth of ale gives you a better return than 1 *s.* 6 *d.* in money would give you?—It makes my men dependent upon me, to a certain extent, and causes me to have my work done in a manner I like.

2084. Suppose that instead of giving them 1 *s.* 6*d.* a week worth of beer, you were to give them 3 *d.* a day more wages, would not that have the same result?—It might not, because one is certain, and the other is uncertain: certain wages, uncertain beer.

2085. It is uncertain money's worth?—You may take it as money's worth, if you like.

2086. You say, I think, that the interest of the occupier of a farm, as regards turning arable land into grass, is different from the interests of the public?—I do not think that the question was put in that way; my answer to the question put to me was, I think, that the public would be injured, inasmuch as no corn is produced, whereas the occupier might not receive any injury whatever, but be benefited.

2087. How would the public be injured by not having this corn?—Because there is a less supply.

2088. The labourers who would be employed in producing this corn are, I presume, employed in producing something else, or are they thrown out of employment, and doing nothing?—Probably they are working elsewhere; if a farmer has no employment for a man, he gets employment somewhere else.

2089. Is it not the case with regard to arable land being turned into grass, that with respect to grass land you produce meat without any labour, while with respect to the arable land, you produce a greater quantity of meat; but in order to produce that greater quantity of meat, you have to employ a greater amount of labour?—Yes; and the whole country is benefited, because those men spend their wages.

2090. But would not that labour be employed in case of land being turned to grass; when these men are thrown out of employment, do they not go into something else, and produce something else?—We know that there is a constant migration of labour; it does not follow that they keep in England; they may go elsewhere, the world is wide and open. But every acre of land not producing corn is a loss to the country in produce.

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2091. *Chairman.*] I think you live at Beddingham, near Lewes, in the county of Sussex?—Yes.

2092. What quantity of land do you farm?—Six hundred acres.

2093. Do you rent that land, or is it your own?—I rent it.

2094. Have you any occupation besides farming?—No.

2095. Have you studied the malt tax question?—Yes.

2096. For a considerable period, I think?—For a considerable period; within the last 20 years I have not thought much of it, but still previous to that I thought a great deal of it.

2097. Do you consider Sussex a good barley county?—Yes, a great portion of it.

2098. Is the part of Sussex that you live in a good barley country?—Yes, some portion of it.

2099. Is yours a barley farm?—Yes.

2100. Do you farm on the four-course system?—Some portion of the land, and some on the three-course system.

2101. How much of your land is barley land?—I suppose about 150 acres.

2102. What is your other class of land?—Heavy wheat land.

2103. Is it land under the Downs?—Yes, within half-a-mile of the Downs.

2104. That part is very stiff, is it not?—Very stiff.

2105. Have you any Down land?—Yes, a very small quantity.

2106. What effect do you think the malt tax has upon the best quality of barley?—It increases the price very materially, which is a great objection, I consider.

2107. The malt tax, you say, increases the price of the best barley; is that your decided opinion?—Yes.

2108. Supposing that the tax was taken off, you think that the price then, would be decreased?—The price of the best barley would be decreased.

2109. Do you think that it would be materially decreased?—Yes.

2110. We have had it in evidence before us that it would increase the price of the best barley nearly as much, perhaps, as 5 *s.* a quarter; that is not your opinion?—Certainly not.

2111. How much do you think it would decrease it?—Five shillings, at least.

2112. On what do you ground that calculation?—I ground that calculation upon this: that if there were no malt tax upon land like that which I occupy (of which, I believe, there is a portion of about 100,000 acres in my neighbourhood) which is barley land, I should then be able to grow barley upon my land which I do not grow at present. Therefore the quantity of middling barley would be so great that it would interfere with the price of the best barley, inasmuch as the best barley pays now a very considerably less duty upon the value of that barley than middling barley does.

2113. Then is it your opinion that the second-class barley would increase in price as the best barley would decrease in price by the operation of the malt tax?—I must qualify that in this way, if you will allow me: Upon this land, which is called second-rate barley land, I can grow as good barley, perhaps, as any in England; indeed it is a very curious thing that I have grown upon that land the best barley in the county of Sussex, as I was told by the maltster to whom I sold my barley; but that was only once in 39 years. So precarious is the culture of barley, that if it rains within a fortnight of its being cut, or if it rains a fortnight after its being cut, my barley is spoiled. In some soils it is not the case. This particular crop of barley which I I grew, I sold to the maltster at the highest price that he had given; and he told me that it was the best malt that he had ever malted in his life. It was grown upon strong land, very well cultivated, and it was a very fine time indeed when I put it in; and the barley came away very well indeed. I had a great crop, and I cut the barley at a very fine time; and there was no rain for three weeks. I let it remain upon the land three weeks; and the fogs and the sun matured that barley, and it became very fine for malting; whereas, if I had carried that barley after it had been cut about a week, it would not have malted at all, although it would have weighed more if I had carried it after a week, than it would do after leaving it out for three weeks; but the difference in price would have been something like 5 *s.* or 6 *s.* a quarter.

2114. Then it is your opinion that the malt tax presses much more severely upon the inferior class of barleys than it does upon the better class?—Decidedly.

2115. Is it within your knowledge that upwards of 100,000 acres of land in your neighbourhood is cultivated with wheat instead of with barley in its proper course?—Oats principally; oats, and wheat, peas, and beans, and fallow.

2116. Instead of barley in its proper course?—Instead of barley in its proper course.

2117. That is to say, that with the malt tax on, it is more profitable to cultivate that land with oats and wheat, than it would be with barley?—Decidedly.

2118. But if the malt tax were taken off, barley would then come in in its proper course?—Yes.

2119. Would that be upon the three-course or upon the six-course system?—Upon the three and four-course system.

2120. What do you call the three-course system?—The three-course system would be wheat perhaps after wheat turnips; and then, if we grow barley at all, we should grow wheat, fallow tares, or rape; and then grow wheat; and then barley after wheat; but that is on a portion of my land, a strong portion of land, which now is entirely gone out of barley cultivation.

2121. In fact, in your part of the country upon that stiff clay under the Downs, you practically grow no barley at all?—There is no clay but it is a strong black alluvial soil.

2122. Partially chalk with it, is it not?—Partially chalk with it.

2123. Have you had any experience in the Act of Mr. Gladstone's called "The Malt b Weigh

Weight Act"?—Yes, of course I have as well s every other farmer.

2124. Do you think that that is beneficial to he farmer in any way?—It is the greatest umbug that ever existed.

2125. It is not beneficial to the farmer, you hink; and if it is not beneficial to the farmer, s it beneficial to the maltster?—No; it is beneficial neither to the one nor to the other, and I will tell you why. A neighbour of mine told me the other day (and I have proved it myself), hat he can grow barley as heavy as any other man, but he does not grow barley because he annot sell it. This barley which I had grown o good, weighed 52 lbs. a bushel. Now I have rown barley which I could not sell at 53 lbs. a ushel, because one coming into action quickly roduces considerably more saccharine than the ther by the restriction system which is now dopted; but that might in a very great measure e got rid of were that restrictive measure done way with.

2126. Mr. *Goschen.*] That was the reason why Mr. Gladstone's Act failed, was it?—I suppose o; Mr. Gladstone merely thought that the weight f barley would give the value of the barley. It s no such thing, because barley at 54 lbs. a bushel s not worth so much as barley at 52 lbs., if the ormer is unkind for malting purposes.

2127. *Chairman.*] That is to say, there is something in the colour which the maltsters do not ike, I suppose, in the case of the heavier barley? —It is not so much in the colour as in the quality. Some barley is so excessively strong, steely and ard, that it will not yield to the working of the arley, whereas other barley is perhaps lighter, ut it yields more like chalk.

2128. Then I gather from you that the repeal f the malt tax would have two effects; it would n the first place, increase the price of the second lass barleys?—Yes.

2129. And in the second place it would enable armers to grow a much larger proportion of barey than they at present do?—Of course it would.

2130. And in growing that larger quantity of arley, they would both benefit the land and enefit themselves?—Of course.

2131. Have you ever tried Mr. Gladstone's mixture, as it is called, for feeding purposes?—No, I was not stupid enough to try that; I know nough of it, and have heard enough of it.

2132. You know enough of it to know that it loes not answer?—I once in my younger days ook up a chemical book and that gave me an dea of feeding cattle, and I can see plainly by hat there is no feeding at all in that mixture.

2133. Have you tried it all?—I have tried the ngredients, but have never tried this mixture.

2134. Have you tried malt for feeding purpose? —Yes, with very great effect.

2135. With regard to oxen?—No, I never tried t with oxen.

2136. But with sheep?—Yes.

2137. You are a large sheep farmer, I think? —Yes.

2138. You have some of the best southdowns? —Yes.

2139. Do you feed your wethers, or your ewes and lambs, with malt?—Anything, and even with malt dust, it is very excellent.

2140. Have you used it much with the duty on?—No, I have only tried it.

2141. But is it your opinion that if the duty were taken off, malt would be used in large quantities for feeding purposes?—I will give you a reason why I believe it would. When I was interested much in the malt tax, 20 years ago, I visited different farmers in different neighbourhoods, and an old gentleman of the name of Hooker, living near Horley, in Surrey, gave me this evidence: "When I was a boy" (that must have been 150 years ago, for it was many years ago that I spoke to him, and he was then an old man), "I used to go with my father's ox-team down into Sussex, to purchase and bring home malt to feed my father's oxen, and my father fed his oxen to a very great extent. The duty then was 4 *s.* a quarter." That is the evidence I got from him, and I asked him the question, "Was it generally used?" His answer was "By all sensible farmers." He meant, I suppose, by all farmers that had money enough.

2142. But in your immediate neighbourhood, is malt used now for that purpose?—It is used by some of my neighbours now, who show sheep, to a considerable extent.

2143. Mr. Rigden, I suppose?—Mr. Rigden and Mr. Waters, and other gentlemen who show like myself; but, in fact, I have given up showing now, and therefore have given up using malt, but we all used malt when we showed.

2144. I wished to ask whether you would only use it as a condiment, in small quantities, in addition to other food, or in large quantities?—Certainly in larger quantities, bearing in mind the proportion of saccharine it contains, which it would not do to give to an animal too large a dose of.

2145. Do you consider that saccharised barley or sprouted barley, as I may call it, is better food for bullocks and for sheep than malt would be?—Certainly not.

2146. You would consider then that the dry malt is better food?—Certainly it is; after it has gone through the process of fire, it makes a different thing of it altogether.

2147. Because we have had it in evidence from Mr. Clayton, that saccharised barley was vastly superior to the malt?—I think he could not have said that. I will clear up that matter by giving you a chemical answer upon that score. Sugar is very good feeding indeed, but it will not do to give in any quantities. The saccharised barley, as you term it, is the same nearly as sugar, but of course there is some portion of starch left in the saccharised barley. Alone, it makes an unwholesome food, although with other things it may be useful for horses and sometimes for bullocks, but horses in particular. It may be used with other food, but it is very dangerous to be used without, because it produces diarrhœa, and every other bad effect. Malt does no such thing; malt is used as you use it for beer. You take and mash the malt just as you do for beer, and then you mix it up with chaff; there is no feeding and there is no condiment equal to that. I do not really consider malt a condiment, but there is no condiment or feeding so strong as that.

2148. But I understand from you that it is not the dry malt you give, but you give it wetted? —We give it wetted.

2149. I wish to know whether you agree with what Mr. Clayton said, when I was talking of Mr. Lawe's experiments, and asked him his opinion. Have you seen the book on Mr. Lawe's experiments?—Yes.

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2150. Mr. Clayton stated that the quantity of dry malt given in those experiments, surfeited the animals?—Of course it did.

2151. And that therefore it was no fair test?—Certainly it was not.

2152. But he said afterwards that saccharised barley or sprouted barley would not have surfeited these animals?—Of course it would not; just the reverse.

2153. And he stated that it was infinitely superior to raw barley?—Is it your opinion that both saccharised barley and malt are superior for feeding purposes to raw barley?—I should doubt whether the saccharised barley is superior to the dry barley, but I think that if the dry barley were used properly and the other barley were used properly, there would be very little difference; still I would give a preference to the dry barley for feeding purposes.

2154. You would give a preference to the dry barley over saccharised barley?—Yes, for feeding purposes.

2155. And over malt?—I do not know; over dry malt.

2156. You have just said that malt is far superior to the barley?—Malt used in my way is far superior to the barley, and is far superior to anything, but if you used it in its dry state, it would surfeit the animal; the animal would not eat sufficient to do it any good, in consequence of the stomach being upset or put out of order by the dryness of the malt.

2157. Did you know that the Excise had interfered in the year 1865, and prevented farmers from sprouting their barley?—I know that Mr. Gladstone wrote to me and told me that I might dry my barley. The barley got wet and sprouted; I wrote to him, and asked him if I might dry that barley for feeding purposes, and he said that I might, by giving notice to the Excise, which is nearly the same thing.

2158. No it is not the same thing, but it is the reverse; the prohibition in the notice in my hands was from steeping the barley till it sprouted; I simply asked you whether you knew of that notice?—I did not know that the Excise interfered.

2159. Perhaps you do know that formerly farmers were allowed to do it?—I have done it, and they have never interfered with it; it was for my horses that I used it.

2160. I asked you just now whether you thought that barley would be grown upon the heavy land?—Not upon the heavy land, but the land I am speaking of is not particularly heavy; it is a thorough barley land, but it is a wrong aspect; now opposite me the aspect is south, and there they grow the very best barley within half-a-mile of this; I lie on the other side, where the aspect is north, and though it is just the same soil, I grow no barley at all.

2161. Supposing that the malt-tax were repealed, all these lands would come in for their share of barley cultivation in its proper order?—Yes, decidedly.

2162. Do you brew for your labourers?—Yes.

2163. Do you give any of them malt?—No, I brew for them.

2164. You brew for them during hay and harvest time, I suppose?—Yes.

2165. It is not the custom in Sussex to give them small beer throughout the year, is it?—Yes.

2166. Do you ever give your men money instead of beer?—Yes, constantly; but I have often had recourse to the beer because I could not get my work done. They came and said, "Master, we must have some beer, and we cannot do the work without."

2167. Is the reason why they come and say that they must have some beer because the public-house beer is so bad?—Yes; I will not allow them to go there.

2168. I want to know whether the men would rather have your beer than go to the public-house and have that beer?—They would rather have my beer.

2169. Would the men rather have the money and then go to the public-house, or have your beer?—My beer.

2170. Supposing that the malt-tax were repealed, would it be a great benefit to you and the labouring man?—Not so great a benefit to me, but a very great benefit to the labouring man.

2171. Why do you say that it would be a very great benefit to the labouring man?—Because every man would have his beer in the bosom of his own family, instead of being driven to the public-house for it.

2172. You mean that the man would brew at home?—He would brew at home, or the master would allow two quarts of beer, as I used to do, to take home; but I found it too expensive.

2173. Do you think that if you allowed the man to take home beer they would share it with their wives and families?—They did so.

2174. You do not think that the taking off of the malt tax would have the effect of making the labourers brew at home in your neighbourhood?—I think they would gradually get into it, particularly if their masters encouraged them; I should encourage it; I put this question the other day to my foreman, "Should you brew at home if I gave you the malt?" "Certainly," he replied. I then asked, "Would our men brew at home if I gave them the malt?" "Yes, sir," he said.

2175. Have you ever turned your attention to any substitute for the malt tax?—Certainly.

2176. What, in your opinion, should be the substitute for the malt tax, supposing the malt tax is repealed?—When there was a duty upon beer a hundred years ago, there was very little drunkenness.

2177. Was not there a duty on beer up to the year 1830?—There was a duty on beer 200 years ago; perhaps it is worth my while to read this extract to you; in 1684, with a duty of 2*s.* 6*d.* per barrel on strong beer, and 6*d.* a barrel on small beer, the consumption was 4,567,293 barrels of strong, and 2,376,278 barrels of small beer, making 6,943,571 barrels of beer.

2178. But the question I asked you was, whether there was not a beer duty up to 1830?—Yes, the beer duty increased up to 1830; I have here a letter written by an old farmer, who was, at the date referred to in this letter, bailiff to my father; the duty paid at the time that he writes this letter was 4*s.* a quarter; that is 6*d.* a bushel; he says, "In the east country, before the duty was increased to 10*s.* 6*d.* a quarter, when I lived with your father, every man brewed his own beer, but when the duty was increased every man then was obliged to give up brewing hi

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is own beer, and he was driven to the gin hop."

2179. Supposing the malt duty was taken off, ave you thought of any substitute for it?—Of ourse I have.

2180. What would you substitute for it?—I ould substitute a beer duty, of course.

2181. Do you think that it would be objectionble to the farmers to be interfered with, because here must be some duty levied upon private rewers; in what way would you propose to do hat?—I would propose that every person brewng for sale should pay a heavy duty, and every erson brewing not for sale should take a small cense to enable him to brew.

2182. You would have a man take a license ccording to the size of the house, or according o the size of the farm that he occupied?—Acording to the rent of the house, or according to he rent of the farm, just as you assess the house ax and property tax.

2183. And you think that taking the duty off malt, nd placing it upon beer, would be a great boon o the farmer as well as to the labourer?—Most ecidedly, inasmuch as he would not then have is labourers always drunk when he sent them ut; now we never have our labourers return ithout getting drunk; formerly there was no uch thing.

2184. Sir *E. M. Buller.*] I think you say that ou would have a heavy duty imposed on all rewing for sale?—It would not really be a heavy uty. The duty formerly was 9*s.*, and I would ropose 2*s.* 6*d.*

2185. Then do you propose a small license to he private brewer?—Yes.

2186. Then you would not contemplate making he charge upon the private brewer by means of license nearly so heavy as upon the brewing or sale?—Yes; I would make him pay in proortion.

2187. Have you calculated what amount of uty per barrel would produce the same amount s the malt tax?—According to Mr. Gladstone's ast statement, there were 20,000,000 barrels of trong beer brewed. Well, when Mr. Gladstone ncreased the duty on malt to 30*s.* a quarter, the onsumption decreased; you will find from the Excise that the amount decreased, that is to ay, he did not get so much revenue when he amount was taken from the 30*s.* as he did fterwards from the 21*s.* 8*d.* Mr. Gladstone eeing that brought the duty back again to 21*s.* 8*d.*, and then Mr. Gladstone very much ncreased the revenue that year. I conclude from hat, that if you lower the price of an article you ncrease the consumption, and by taking 21*s.* 8*d.* off malt, and placing 2*s.* 6*d.* or 3*s.* a barrel upon beer, you will very much increase the consumption of beer; I calculate, at least a third. Therefore, taking Mr. Gladstone's calculation, I take it that 30,000,000 barrels of beer would be produced, and if you then assess 30,000,000 barrels of strong beer at 3*s.* it would amount to nearly five millions of money. But then I think it but fair to put a small duty upon small beer, and I made a calculation that if you were to place 6*d.* a barrel upon all small beer sold at not more than 6*d.* a gallon, increasing the duty to double the amount when it got to 9*d.*, that is to say, making it 1*s.* a barrel; 2*s.* a barrel when it is sold at 1*s.*; 4*s.* a barrel when it is sold at 1*s.* 3*d.*, and 8*s.* a barrel when it is sold at 1*s.* 6*d.*; you would raise an enormous revenue, and then you would not be imposing a duty nearly so heavy as it was formerly when all strong beer paid 9*s.* a barrel. You relieve the malt duty of 21*s.* 8*d.*, and then you do not charge so much for the duty on beer as it formerly paid with the malt duty.

2188. Have you ever calculated the proportion of price which is now occasioned by the malt tax?—Yes.

2189. How much a barrel is it?—I have an account of it here, and I may say that my evidence is all practical here. I take the moderate barley, which is the barley we should then all of us brew, which was sold at 34*s.* a quarter this last year. The malting of that barley was 4*s.*

2190. What would the price of the two bushels be?—At 34*s.* a quarter it is 4*s.* 3*d.* a bushel.

2191. That would be 8*s.* 6*d.* for the two bushels?—Yes; that is the barley, not the malt.

2192. I wish to have your estimate according to that?—Then the malting of that barley would be 4*s.* a quarter, that is, 6*d.* a bushel.

2193. It would be 1*s.* on the two bushels?—Yes; we should then brew 36 gallons of very nice decent beer.

2194. You must have hops?—We required about 1½ pounds of hops or a pound of hops for fresh beer like that, say, half a pound to the bushel.

2195. How much is the price of that?—The price is 1*s.* 6*d.* a pound, sometimes less.

2196. What is the expense of brewing?—We consider that all the firing is paid by the grains.

2197. And the yeast would cost what?—That would be 3*d.*, and the man's labour, perhaps, you would call 2*s.* 6*d.*

2198. You put the brewing at half-a-crown?—Half-a-crown for the brewing.

2199. Not on two bushels?—No; I should say that when that man did brew, perhaps he would be able to brew 10 barrels or perhaps 20; the man would be the whole day brewing a quantity.

2200. Ten barrels for 2*s.* 6*d.* would be 3*d.* a barrel?—Yes.

2201. That would come to 11*s.* 3*d.* as the cost of brewing 36 gallons of good beer?—Yes.

2202. Eleven shillings and threepence would represent a price of something like 4*d.* a gallon?—Yes; In brewing this description of beer, we should be brewing better beer than we give our men; therefore, we should make a little small beer.

2203. That sum which you have mentioned would be sufficient, and more than sufficient, to pay for the beer?—Yes.

2204. That 4*d.* a gallon would be the expense of brewing 36 gallons?—Yes.

2205. Thirty-six gallons of beer brewed from two bushels of malt, you are aware, are sold for 36*s.*; I am talking of beer sold wholesale in the barrel?—I pay 54*s.* for a barrel of 36 gallons, and it is not a bit better than I can brew.

2206. What do you calculate the profit of the brewer to be?—I dare say it would be 200 or 300 per cent.

2207. Supposing you add to your 12*s.*, which is the expense of brewing your beer, the malt tax, what would that be?—The malt tax would put me to 28*s.* a quarter difference; 21*s.* for the tax, and restrictions, and malting and risks, and so on, would make it at least 28*s.* a quarter.

2208. A fourth of that would be 7*s.*, therefore two bushels would be 7*s.*?—Yes.

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2209. Then you would brew, under existing circumstances, with the malt tax on, your 36 gallons for 19*s.*?—Under present circumstances.

2210. Taking 12*s.* without the malt tax, and 7*s.*, as you say, for the malt tax and the inconvenience which the malt tax throws upon you?—I should imagine that that would be nearly it.

2211. And for beer no better than that you pay to the brewer 54*s.*, not retail, but in the cask?—For a certain beer; where it is made I do not know; but there is a certain beer that I get for 54*s.*

2212. But the beer that the brewer usually sells for a shilling a gallon is made from the same quantity of malt as you profess to make beer from?—I do not know that; but my beer would be considerably better than that beer at a shilling a gallon.

2213. Your statement is, that you could brew for 19*s.* as good beer as you pay 54*s.* for, and that would be the difference?—My beer at 19*s.* is a great deal better than what I pay 54*s.* for.

2214. Mr. *Read.*] They why in the world do you pay that?—I do not buy; I merely allow the men that beer, but it makes them tipsy. It is not, to my taste, nearly so good as the beer which I brew at 19*s.*, but I suppose it is made at a more expensive rate than I can make it at, inasmuch as many things are put into the beer which I know nothing about to make it good, making it in reality very likely worse, in many respects, than mine. But I could not make my beer for 19*s.* to sell against the beer sold at 54*s.*

2215. Sir *E. M. Buller.*] The 54*s.* beer is stronger beer, then?—It is a stronger beer, it is a more heady beer; I should think that the 1*s.* beer was nearer the mark. I know nothing about the brewing.

2216. In point of fact, it comes to this, that if there were no malt tax, you might brew for 12*s.* what now costs 36*s.*?—Yes, certainly you might do it. That, I think, would be a very fair way of putting it.

2217. Then, either in the shape of malt tax, or in the shape of brewers' profits, the consumer pays now 200 per cent. on the cost price of the article, according to your view?—Yes.

2218. Can you calculate how much of that 200 per cent. consists of tax?—I should imagine that a great portion of that is attributable to the tax, inasmuch as the tax produces monopoly.

2219. You think that the tax produces monopoly; how?—If it did not produce monopoly, I am perfectly certain that the brewers would not be so anxious not to get rid of the malt duty. It produces monopoly, in consequence of the enormous capital which it requires to brew, and which does not allow a man with small means to brew at all.

2220. If the effect of the tax is to make the material of which he brews his beer cost 60*s.* a quarter instead of 40*s.* a quarter, would it not require one-third more capital to carry on a brewery; would it not require, for instance, 60,000*l.*, to carry on a brewery, which would otherwise be carried on for 40,000*l.*?—Yes.

2221. And that large capital being required, in your opinion does produce a monopoly in the hands of the brewers?—Yes.

2222. Mr. *Read.*] You said that you thought that the repeal of the malt tax would decrease the value of the best barley?—Yes, I have n doubt of it; that is merely my opinion, o course.

2223. You know that a small extent only o the best barley is grown?—Yes.

2224. And that it requiries a certain conditio of soil and climate to produce that good quality —Yes.

2225. You are aware that it is now used fo the best pale ale?—I do not know what it is use for.

2226. You are aware that they cannot bre pale ale except from the best qualities of barley —There is no doubt that it would rarely be used except for a delicate purpose.

2227. Do you think that if the malt tax wer repealed, there would be less pale ale made?- No, a greater quantity of middling barley woul be grown to take the place of some of this bes barley, which is not brewed into pale ale. If th whole of the barley which is so good was mad use of for brewing pale ale, then I do not believ that the other barley coming into use would mak any difference: but inasmuch as the pale al could not consume the whole of the best barley a portion of that barley is made use of for a les delicate purpose; so that the barley which woul then come into cultivation and be grown woul have the effect of interfering with such portion the best barley as is now used for coarse pu poses.

2228. Then you are not aware that at the pre sent time, that the best barleys are now all co sumed for making pale ale?—I am not awa of that.

2229. And that they cannot use second cla barleys for that purpose?—I know that the cannot use them for that purpose.

2230. You say that all malt to be given cattle ought to be wetted?—Certainly.

2231. You are aware that this mixture, which mention has been made, is very finel ground?—I am aware of that.

2232. Would the same good effects be pr duced by wetting that meal as would be produce by wetting the whole malt?—No, because contains a quantity of linseed, which linseed ac too powerfully upon the system of the animal admit of the aperient properties of the barle doing the animal any good.

2233. Are you aware that Mr. Laws gave th malt, all of it, dry in his experiments?—No, I a not aware that he did; I hear he did.

2234. If he did give it dry, you would imagin I presume, that not the best results would follow —Certainly they would not.

2235. Generally speaking, on your strong lan you grow a heavy description of barley?—W would grow sometimes a very heavy descripti of barley when the climate is proper, and we g a proper cultivation; but it is very rarely that can grow barley on such land.

2236. Consequently, that Act of Malting Weight, which was passed specially for the bene of barley grown on heavy land, has been of ve little use to you?—No use at all.

2237. Major *Parker.*] A good many questio have been asked of you as to the advantages rivable from feeding cattle and sheep with mal is it not your opinion that, to insure success in t feeding of cattle and sheep, it is desirable to chan and mix their food; and do you not consider i

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great hardship that you should be prevented using the corn you grow, in such manner and in such proportion as in your judgment may be best?—Certainly.

2238. I ask you that question particularly, because your attention was called to the using of malt for feeding cattle; I clearly understand you now to say that you think it desirable, as a farmer, not to feed your stock with malt entirely, but to mix it in such a way, in accordance with the condition and state of health, and the general character of the things you are feeding, as in your judgment as a practical farmer is best suited to bring your stock to market?—Certainly. You may feed entirely upon malt; but if you do not wet the malt, you cannot feed entirely upon it. If you wish to use your malt dry, you must use it with other ingredients, and it requires considerable practice to regulate the quantities.

2239. Mr. *More.*] If the malt tax was repealed, do you think that malt would be much more generally used for feeding purposes?—I mentioned just now that farmers generally used it in former times, but since my time they have not used it in consequence of the duty.

2240. It has often been stated that it is used only as a condiment; is that correct, or not?—No; it is no more a condiment than tea.

2241. Do you think that the use of malt for feeding purposes would be as general as that of any other article, if the tax were repealed?—Of course, on account of the saccharine matter it contains.

Monday, 8th July 1867.

PRESENT:

Colonel Barttelot.
Sir Edward M. Buller.
Mr. Stephen Cave.
Lord Eustace Cecil.
Mr. Dent.
Colonel Duncombe.
Mr. Goschen.
Mr. More.
The O'Conor Don.
Major Parker.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

EDWARD S. CAYLEY, Esq., called in; and Examined.

E. S. Cayley, Esq.

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2242. *Chairman.*] I THINK you reside at Wydale, near Brompton, in the county of York?—Yes; I might say near Scarborough, as the most intelligible place I can name.

2243. Is it in the North Riding of Yorkshire?—It is in the North Riding of Yorkshire.

2244. You reside upon your own estate, do you not?—I do.

2245. Do you farm yourself?—I hardly occupy any land. I have some four or five acres of hay, and I think that is all (except some moorland which I occupy as plantations).

2246. Have you any practical knowledge of the cultivation of land?—I have lived amongst it all my life, and have had a good deal of talk with farmers, and therefore I, more or less, know about it.

2247. Is yours a barley growing district?—Part of it; we live on a hill side. As you go to Scarborough from York, you pass through a long valley, which has a considerable plain at the bottom of it, some of which is barley country no doubt. About Knapton, for instance, where it is sandy, some of the land on the flat is heavier; when you get on the hill side, running up to the moors, you get some very fair barley ground.

2248. You may say, then, that it is a partially barley growing district?—Yes, it is a partially barley growing district; barley is generally grown, but not a very good sample of barley.

2249. Do you grow the best sample of barley in that district?—Occasionally we get a good sample of malting barley, but I do not think that we generally produce it. The sample is generally high coloured. I have seen an excellent sample of it grown two years ago.

2250. As a rule, you do not grow the best barley?—In that district we do not, I think, grow the very highest sample of barley.

2251. Have you turned your attention to the effect that the malt tax has upon the barley grower?—Yes, I have; that is to say, so far as to see that it must lower the price of the article that he produces; that is, lessen the consumption, and therefore lower the price.

2252. You think that the malt tax has the effect of lessening the price as well as the consumption of the best class of barley?—Yes, and I should say that it not only lessens the price of the best class of barley, but of the inferior class of barley as well; perhaps more.

2253. The best class of barley is what I am speaking of at present?—It would certainly lessen the price of the best class of barley, but possibly not the comparative price so much. I should think that probably it lowers the lower class of barley more than the higher class.

2254. We have had it in evidence that if the malt tax was repealed, it would enhance the price of the best barley by 5 *s.* a quarter; is that your opinion?—I think that must be perfect guess work; because I do not see what grounds one could possibly have to form an accurate estimate upon; but speaking roughly, it might not only affect the best quality of barley to that extent, but I should consider it might affect all grain to the extent of about 5 *s.* a quarter. Still that is a mere guess.

2255. You have no doubt at all that it depreciates very much the price of the inferior barley?—It must do so; because the inferior barley would be used for brewing were it not for the tax.

2256. Do you know from experience, that is to say, from observation, that the inferior barleys are, to a certain extent, a drug in the market?—They do not sell at all in comparison with what their value would be were it not for the tax. The tax makes it almost impossible to malt them. Their comparative value is less when malted; that is to say, it is cheaper to malt the higher class barleys than it is the lower, in spite of the difference of price; but the lower class barleys would malt sufficiently to make a perfectly good ale, were it not for the artificial cost which the tax puts upon them.

2257. You mean to say that whatever class of barley it is it has to pay the same duty?—Yes; if from the best qualities of barley the maltster can get so many pounds of saccharine, paying such and such a duty, he will not of course malt something which will only give him less saccharine, still paying the same duty. Supposing that the best barley would produce 10 pounds of saccharine to the bushel, it would not pay him to malt barley which only produced eight pounds to the bushel.

2258. Have the prices of barley come within your knowledge during the last year at all?—I was told yesterday by a large practical farmer in my neighbourhood, on my asking him the question with a view to this inquiry, that the price of barley in the Malton market had averaged, taking grinding, barley, and all barley together, 28 *s.* a quarter for the last year. He was a valuer valuing for incoming and outgoing tenants, and therefore it was a matter of importance for him to know, and he told me that he had inquired and ascertained that fact.

2259. Do you know that barley has been selling during the last year as high as 55 *s.* and 56 *s.* a quarter?—I know that some has been selling very high.

2260. And that ordinary barley has been selling as high as 40 *s.*?—In some cases, I believe, it has; but the barley in the district I speak of was very inferior last year; it was an inconvenient harvest.

2261. The barley last year averaged 28 *s.* for malting purposes, as I understand you?—No; the whole sample of barley at that market, I was told, sold at that price as the average; a good deal of it would be very inferior in quality. I do not think that we last year produced much malting barley in that country. It was about one of the worst barley harvests ever seen there.

2262. Do you know that Mr. Gladstone introduced an Act for malt by weight?—Yes, but I do not know whether anything has been done under it. The fact is, that I have not for the last year or two been paying so much attention to the subject as I should otherwise have done, because, owing to the cattle plague, it has been difficult to get the farmers together.

2263. You are the President of the Malt Tax Repeal Association?—Yes, for the county of York.

2264. Have you met and discussed this matter lately?—Not very lately; the thing has been asleep for the last 12 months. The farmers did not attend the market, in consequence of the cattle plague, and not being there, it was difficult to get them together.

2265. Not because they were more lukewarm in the repeal of the malt tax?—Not in the least that. If it had been known beforehand that it was intended to summon anybody to give evidence here, we should have called a meeting, to procure the best evidence; but I was called upon rather suddenly.

2266. Do you know that formerly it was supposed that people could spear barley, and give it to their cattle in that state; that is to say, sprout it?—Yes, I have heard it was considered that that might be done.

2267. And that in the year 1865 the Excise interfered, and that has been stopped?—I have understood so.

2268. Have you turned your attention to barley in that state; do you know whether it is very good for cattle?—Not specially. I have not known many experiments made in my own neighbourhood, further than I have seen them mentioned in the papers. I have heard it said that sprouted barley has fattened faster than some other things, but I have nothing to state of my own knowledge on that subject.

2269. Do you know that there was another Act passed, called "The Malt for Feeding Cattle Act"?—Yes.

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2270. Have you had any knowledge how that has worked in your part of the country?—I could give an answer with respect to malt for feeding purposes, but not with respect to that untaxed malt. The case in which I knew malt used for animals was this: it was made into sweet wort, and given to lambs as a substitute for cows' milk. A neighbour of mine, who farms about 1,000 acres of land has been, for the last two years in the habit of giving this wort, made in a three quart jug, with hot water poured over it, to his lambs when the ewes do not milk freely, and he says that he has never lost a lamb since, and that with cows' milk in previous years, used for that purpose, he has lost considerably. This year I was riding home from market with him, and stopped with him to order some malt for this purpose, which was not the untaxed mixture; he went to a common maltster to order it; I had seen him using it a year before. He said that it still answered and was extremely valuable. He used the taxed malt for the purpose, because I believe he fancied that it was doubtful, in the first place, whether he might not get into a scrape for making a wort out of the mixture,; and again, that it was ground too small to mash conveniently, and so he was using the taxed malt for the purpose.

2271. What quantity of sheep does he keep?—About 500 ewes.

2272. Does he use this every year?—He has for the last two years.

2273. Have there been any experiments in your neighbourhood for feeding cattle with malt?—I am not aware that there have. I believe that some of the short-horn breeders have used it; the two Messrs. Booth, who live at a distance from me, though in the North Riding, I understand, have used it, but I cannot speak from my own knowledge.

2274. Do you know anything about the interference of the malt tax with the rotation of crops; do you know that wheats and oats are very often substituted instead of barley?—I have understood it is so from farmers; and not only that, but there is a more serious interference still with the rotation of crops, in consequence, as I believe, of the pressure which this tax puts upon grain growing. I believe that grain is becoming less profitable to grow than grass, and it is becoming much more common to let land lie in seeds for two or three years than it used to be; and certainly I think that any gentleman with experience in land will bear me out in saying that grass is certainly much more easy to let than tillage. I should say that some of my own land, which is let at 2 *l.* an acre, which in our district is the top price for best land, would certainly let at 3 *l.* or 50 *s.*, if laid down to grass.

2275. Then yours must be first-class land?—It is a farm of 250 acres of first-class land that I refer to.

2276. Where the grass has been laid down, has it been light land or heavy?—I am not speaking of grass that has actually been laid down; it, generally speaking, goes to seeds for two or three years.

2277. Mr. *Dent.*] Are you speaking of contiguous fields, one of which is old grass, and the other arable?—I have bits of land let off, not contiguous fields, held by the same tenant, for which I could no doubt obtain a higher rent, if laid down to grass; but I am speaking generally of the comparative value of land in grass, and

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and land of similar quality, similarly situated in tillage.

2278. You have not laid down arable land to grass and then let it at an increased rate?—No.

2279. The comparison was rather drawn between arable land being worth 2 *l.* and similar land in grass worth 50 *s.*?—I believe that grass, though I am not laying it down, is being laid down. I was told yesterday that the whole of the property which belonged to the late Mr. Bates, the cattle breeder, was now being laid down to grass.

2280. *Chairman.*] Do you know what the soil is in that case?—I believe it is a strongish soil; most of the Cleaveland soil is. Perhaps I have hardly explained myself. You get a very much heavier gross produce of animal food off tillage than you get off grass. I believe that, putting it roughly, you may say that from a turnip crop you will get nearly four times the weight of beef that you would from the same land under grass, or adjoining land under grass. I believe that from the first year's seed-crop you would also get a very much heavier quantity of beef or mutton than you would off the same land in grass, or contiguous land in grass. You will find that your tillage land running over the four-course shift would produce you nearly double the weight of animal food that you would get from the same land were it in grass. Where the land is laid down to seeds for two or three years, the second year does not produce the same amount of seeds as the first, and the third year would be less still, and the result is that you seriously decrease the amount of animal food which is produced in the country; and what applies to animal food would apply to wool also.

2281. Then, if you cannot produce the same amount of animal food from these seeds, why is the land left in seeds for three years?—Because the labour bill is much less, and the manurel bill is less. This artificial taxation presses upon the price of grain; the pressure upon the price of grain, to a certain extent causes, or tends to cause, land to go to grass, or two years' seeds; that causes beef to be scarcer, and therefore it fairly fulfils the old proverb, "down corn up horn." My impression is, that you cannot depress the price of grain unnaturally without unnaturally forcing up the price of meat and wool. I am perfectly well aware that just at the present moment there has been a fall in the price of meat and wool; but that I attribute to the commercial crash that took place last year.

2282. But with the present price of meat, I wish to ask you whether you think it is profitable to the farmer to follow the course which you have now stated, or to keep his land according to the course he usually adopts?—Without a profitable corn crop, land cannot be cultivated; green crops hardly pay their way. A good deal depends upon the character of his land; but it is becoming more and more profitable to use more grass and less tillage, and the result I believe is, that stock is scarcer, and therefore grows much more difficult to buy, and meat has gradually risen in price.

2283. What I wish to understand is this, whether that is the case with the best class of land?—It is more the tendency with the inferior class certainly, than with the best class. As the price of corn is depressed, it becomes too cheap to leave a profit on the poorer soils before it does so on land of a better class.

2284. Is that tendency with the lighter or with the heavier inferior lands?—It is a little difficult to say. I should think that it is very much the tendency with the heavier.

2285. We have had it in evidence that a great quantity of light land has been laid down to grass?—I should think it probable that there has been, but I should think that the tendency would, on the whole, be more with the heavy land as being more expensive to till. I do not in the least say, however, that it does not take place with regard to light land.

2286. Do not you think with regard to light land that you could get a greater quantity of stock by cultivating it on the four-course system, than by laying it down in grass?—Yes; you have a much greater gross produce, but a smaller nett produce; the cost of tillage is so much greater than of grass that it eats away the whole of the difference in the gross produce; therefore, I conceive that it is the farmer's gain to lay some kinds of land to grass, or let it lie in seeds (I do not say that it is so on all lands), which is very detrimental to the public interest, because there is a less quantity of animal food produced for people to eat, and beef and mutton and wool become scarcer.

2287. And your belief is that the malt tax has had a great deal to do with that?—I believe that it must have had. The pressure of a tax of that kind upon the raw material must have decreased consumption to a great extent; in fact, we know it has. There is a very curious fact, which I get from "Ford's Malt Trade and Laws," that the yearly consumption in England and Wales (because there was no tax in Ireland or Scotland in early days), from the year 1700 to about the year 1725, was about 30,000,000 bushels. In the year 1713, or about that date, there was a provision made allowing persons to malt privately on paying a composition of so much a head for their households; I think it was 5 *s.* a head. There was a good deal of malt made privately, and, therefore, the 30,000,000 bushels will not represent the whole amount of malt that was made then. But when we come to look at the population, the population at that time was in round numbers something over 5,000,000; not much over that. The population of England and Wales at the last census was 20,000,000. The malt consumed on an average up to within four or five years ago (I cannot speak to it afterwards, but I believe that has increased since) in England and Wales would not be over 36,000,000, which allowing for private malting is hardly an increase upon what it was in the year 1725. So that the consumption per head of malt is, I believe, now something like, in round numbers, one-fourth of what it was from the year 1700 to the year 1725.

2288. Do you account for that by other articles being used instead of malt?—No doubt "there is a good deal that runs out at the spiggot that never went in at the bung-hole," as the proverb puts it. I believe that there is a good deal of sugar goes into beer. I tried the experiment in private brewing, of putting sugar in it, and produced ale very much like that which you get in public-houses. When sugar is used in public brewing there is an extra duty. I cannot say what the extra duty is at this moment; but what I should like to point out to the Committee is this, that the duty upon sugar, which would be something like 10 *s.* a hundred-weight I think, roughly speaking, is not much more than a third of the duty upon the saccharine, which, in brewing, is

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s usually extracted from the malt; and therefore, no doubt, for private brewing it would compete very considerably with malt; and that is a state of things which we strongly object to.

2289. In your part of the world, do the farmers give the men beer for haying and harvest?—In hay-time and harvest they do.

2290. Do they give them small beer all the year round?—No. The beer comes only in hay and harvest time, unless it be that an extra glass of ale may be given, for extra service, occasionally. There is hardly any beer consumed on the farm except at hay-time and harvest. They often use treacle beer in the farm-houses, flavoured with ginger, or bay myrtle, at other times.

2291. With the exception of hay-time and harvest, beer is not given as wages?—No.

2292. Do any of the people brew in your part of the country?—It is not very common among farmers. I have brewed myself, because I thought it desirable to understand the process.

2293. Do the poor people brew, I mean?—The poor people do not in that part of Yorkshire. There are some that do in the West Riding, but not in my neighbourhood.

2294. Do the farmers give malt sometimes instead of beer?—No, it is always in the shape of beer that they give it in harvest time.

2295. Do you know whether the people would rather have the beer which the farmers give them, or would rather have money instead of beer?—I have never heard the thing called in question. I have heard of coffee being given sometimes, that is to say, I have heard of a teetotaller being engaged, and their giving him coffee; but I think there is no tendency on the part of the general labouring population to desire anything else but beer.

2296. What sort of beer is it in the public-houses in your country?—It has the taste of sugar.

2297. Would the men prefer the farmer's home-brewed beer or the public-house beer to drink?—I have not the slightest doubt that they would rather have a glass of my beer, home brewed, than two or three of the public-house beer.

2298. Do you think that it is adulterated?—I should be very sorry to say that they put coculus indicus in it; but my impression is that sugar makes it less palatable; I do not say that it is unwholesome.

2299. Lord *Eustace Cecil.*] Does it keep as long as beer brewed from malt?—I cannot say. I tried the experiment last March, and have not kept it long enough to see. Indeed both myself and my steward have tried experiments with sugar. I was brewing 10 gallons to the bushel, and after running that quantity off the malt in two mashes, I ran a third mash through the grains of about half that quantity of liquor for the purpose of getting a certain proportion of ferment. I do not think that there was any sweet taste in it. I then added the sugar to it in the proportion of about a pound to a gallon.

2300. You have never made beer with sugar alone?—No; you cannot do it quite alone, you may use a handful or two of flour, or a large quantity; yeast is necessary.

2301. *Chairman.*] Supposing that the malt tax were taken off, do you think that the common people in your neighbourhood would brew generally, or not?—I have no doubt that they would do so; it would take a certain time, of course, for them to get accustomed to it, and to know how to do it.

2302. Are the coppers they usually have in their houses sufficient for that purpose?—Yes; you can do it very well with a large kettle. I, myself, as a first trial before beginning to keep house, have brewed with a 30-gallon copper set in a washhouse, and an old sherry cask, which cost 5 *s.* or 6 *s.*, for a mash-tub. I had a company of volunteers, and brewed them some ale for drill nights, and very much they liked it. I mention that in reference to the cheapness and the simplicity of the apparatus that is necessary.

2303. Then it is your opinion that, if the malt tax were repealed, it would be a great boon to the producer as well as to the consumer?—I believe that it would be a great boon to the farm labourer, as giving him a wholesome and cheaper beverage, for it takes the place of other food.

2304. Have you ever turned your attention to the question of a substitute for the malt tax?—I have considered what might be done.

2305. In what direction did your views go?—I conceive, in the first instance, although I should very much rather see beer free from taxation, that it would be much cheaper to the public to raise the money upon the finished article, beer, than upon the unfinished article, malt.

2306. Do you consider the private brewer in that?—I consider that it would not be difficult to deal with the private brewer. I should deal with the private brewer upon the principle of the Act of Queen Anne, which allowed private malting, on a composition at so much per head upon the household. I mean that brewing would be returned like any of the assessed taxes, and that there would be returned also the number of persons in the household over a certain age. I have not matured the plan so far as to say what would be a reasonable age. I think that in the Act of Anne it was 14. A composition of say 5 *s.* a head, would more than cover the actual consumption of malt in cottages; but I presume that they might consume more if they had it in their own houses.

2307. In fact you think that the beer duty would be far preferable to the malt tax?—Yes.

2308. Being upon the manufactured article, and not upon the raw?—Yes; because where you tax the raw material, the person who manufactures the raw material, he has to make an advance to the Government. The tax upon the malt is 2 *s.* 8½ *d.* a bushel. If you take the average price of malting barley which has been for some years about 4 *s.* a bushel (it has been dearer this last year), and the duty to be 2 *s.* 8½ *d.*, you would have to give 8 *s.* a bushel for that malt if you were buying it from the maltster, that is to say, going to the maltster for a quarter of malt, or a bushel or two of malt, you would have to give that price. If you had your barley higher you would have to buy the malt proportionally higher. I think I gave 9 *s.* or 9 *s.* 6 *d.* for malt this spring for my own brewing; the barley would be 5 *s.* to 5 *s.* 6 *d.* perhaps this year.

2309. But malt this year is exceedingly dear?—It is singularly dear in consequence of barley being dear; but I am pointing out, that assuming 4 *s.* a bushel to be a sort of average price, which you would get a fair malting barley at, you would have to give 8 *s.* for malt made of it. Therefore, while without the tax it costs 4 *s.*, the public has to pay 4 *s.* more for it because of the tax.

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2310. Mr. *Dent.*] There is the cost of malting to be reckoned?—The cost of malting you may consider as nothing, for this reason: the malt swells in bulk; and the old rule used to be (if you will refer to Cobbett you will find it so stated) that if you took a bushel of barley to the maltster, he would give you back a bushel of malt, and not charge you anything for the malting, he being paid by the increase of bulk beyond the bushel which you had taken him.

2311. Sir *E. M. Buller.*] Did you not, then, send in by one measure and receive back by another?—Cobbett makes no statement of that kind that I remember.

2312. You do not know that to be the fact, that barley used to be sent in at the Imperial bushel, and sent out by the maltster at the Winchester bushel?—I do not think that the Imperial bushel existed then.

2313. Bushels, we know, varied in all parts of the country; but you do not know, from your own knowledge, that it was the practice that the malt was received in by the maltster at the ordinary bushel of the neighbourhood, and sent out at the Winchester bushel?—I cannot speak to that. Nothing of the kind has taken place, I think, since the year 1783.

2314. *Chairman.*] Taking the average price of barley at 32 *s.*, which it has been for some years past, I believe, what per-centage do you say that the malt tax puts upon that barley; or rather, what per-centage is the malt tax in regard to that barley?—It depends upon, in the first place, the way in which you look at it. The question of what the pressure of the tax is, is one thing as to what it brings into the Exchequer; but it is another thing as to what it costs the public. It does not follow that it costs the public the same as it brings into the Exchequer.

2315. What I mean is this: when it is made into malt, what per-centage has the malt tax put upon that malt to the purchaser of the malt?—I say that it puts 100 per cent. upon that malt. It would depend a little upon the price of the barley; but assuming the barley to be at 32 *s.*, that is 4 *s.* a bushel, it puts 100 per cent. upon that; that is to say, if I am right in my fact, that the barley which would sell at 4 *s.* sells as malt at 8 *s.*, and that the cost of malting would be paid by the increase of bulk (which I believe varies from about 8 to 10 per cent.), then the cost to the consumer is doubled. If your barley was at 5 *s.*, it would be in the proportion of 4 *s.* to 5 *s.*; if at 6 *s.*, it would be in the proportion of 4 *s.* to 6 *s.*; therefore at the price at which you put it, it is cent. per cent.; at a larger price it would be a less per-centage. Supposing, for instance, the price of the grain to be 6 *s.*, I do not suppose that it would double that 6 *s.*, but it would add 4 *s.* to it as it added 4 *s.* to the lower price, and thus the per-centage would be a less per-centage.

2316. Sir *E. M. Buller.*] Then, in point of fact, the malt tax being 2 *s.* 9 *d.*, the cost of malting being nothing, the profit of the maltster upon each bushel malted by him is 1 *s.* 3 *d.*?—I assume it to be so, or something like that; I do not say that the cost of malting is absolutely nothing, but that it is practically very little.

2317. That would be about 30 per cent. profit, would it not?—About that; namely, 70 per cent. tax, plus 30 per cent. maltsters' profit, and cost of Excise interference.

2318. The duty is 2 *s.* 8½ *d.*?—That is about 70.

2319. Then 1 *s.* 3½ *d.* would be the profit?—That would be 30 per cent., and it makes up together cent. per cent.

2320. Then the maltster's profit is at the rate of 30 per cent.?—It is undoubtedly so; but I take it that that is not all absolutely profit. I am speaking, in referring to the cost of malting, to the natural cost of malting, and not to the interference of the Excise, which induces a considerable extra expense; a great deal more particularity has to be observed, and a greater cost incurred in consequence of the Excise interference.

2321. Either as profit or the increased expense which the Excise puts upon it, there is 30 per cent. charged to the consumer over and above the malt tax?—Yes, over and above what comes into the Exchequer.

2322. So that, taking the articles in the hands of the maltster, and passing from the maltster to the public, the tax imposes an increased cost to the consumer of 30 per cent.?—I do not quite catch how you put it, but I mean that the tax itself is 70 per cent., that the increased cost to the public is 30 per cent. more in round numbers, and that makes it 100 per cent. altogether in the stage of malt. Of course, when the malt passes through another stage there is another increase to be reckoned.

2323. Take the brewer purchasing malt; he pays not only the tax, but an increase of 30 per cent. more?—He would pay something approaching to that. I am rather speaking, in giving that figure, of the private consumer, who would certainly pay something like that; but I dare say there would be a trade allowance to the brewer.

2324. Now, the brewer taking his bushel of malt, which would cost him 8 *s.*, from that, makes 18 gallons of ale?—That would be small ale; I make 10 gallons out of the bushel.

2325. We will suppose it to be 18 gallons?—I dare say a good deal of ale is brewed at that strength.

2326. Supposing he sells that at 1 *s.* a gallon?—That might be; then there are the hops.

2327. You put the hops at how much?—A lb. to the bushel.

2328. Say 1 *s.* 6 *d.* a lb.?—We do not get our hops as cheap as that; for bitter beer you would have to put 1¼ lb. of hops.

2329. Comparing that 8 *s.* which the brewer pays for his malt with what he gets clear when you deduct the price of hops, he receives 16 *s.* 6 *d.* for what costs him 8 *s.*; that is to say, when he turns it out in beer he receives 16 *s.* 6 *d.*?—You have taken the hops, as I understand, from the price of the beer, not added them to the malt?

2330. I have taken them from his profit. Supposing he has sold the beer at 18 *s.* in order to ascertain what is the enhanced cost that he puts upon the consumer, you must deduct the 1 *s.* 6 *d.*, and then that reduces it to 16 *s.* 6 *d.*?—I should have done it the other way, and added all the cost together; but it comes to the same thing.

2331. Then you see from that that the maltster has got his 100 per cent., and the brewer gets upon what he has paid to the maltster 100 per cent., and more?—Possibly, you should in that allow something, because, though the cost of brewing is not great, it may be something. The old calculation used to be, that you sold your yeast and used your grains as pretty nearly a set-off against what it cost you to brew; but I suspect that in the case of a large public brewer the grains

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grains in those large quantities might not be very saleable.

2332. Then is it your opinion that the great brewer brews at greater expense than the small one?—Hardly that; he may have better machinery, but less facility in getting rid of his grains, because, probably, the small brewer is a farmer as well, and very likely consumes the grains for animals on his farm; so that there should be probably some small allowance made for the actual cost of brewing.

2333. Do you know the price usually paid for grains?—I hardly do. I never heard of any being sold; they are generally used by the people themselves who brew in my district, because they are people who are also farmers. I have used my own grains for poultry.

2334. In point of fact, you do not know the price at which grains are usually sold by the great brewers, and you do not know whether they have or not any difficulty in disposing of them?—I cannot speak to that, but I can imagine that there might be a difficulty of that kind.

2335. But you think that there might be an advantage to the small brewer over the large brewer in that respect; that he would have a use for his yeast and his grains?—Yes. Of course, the larger quantity you brew together, the greater quantity of extract you make in proportion to the malt used, and therefore the large brewer has considerable advantages in other ways which the small brewer has not; but I should think that in that respect he might be at a little disadvantage in the disposal of his grains.

2336. Then supposing the profits of the brewer to be, at any rate, 20 per cent., say, he will have to charge, in order to obtain that profit, 20 per cent. upon the enhanced price of the malt, just as he would charge 20 per cent. upon the rest of the price of the malt?—Yes.

2337. So that before it gets to the consumer the incidence of the tax would be enhanced by his per-centage, whatever might be his rate of profit on the interest which he has to pay on the increased cost of the malt?—Of course.

2338. He has to calculate not upon the 4 *s.* which the malt would cost were there no duty, but he has to consider upon the 8 *s.*?—Yes, upon the malt the cost of Excise interference, and the maltster's profit, tax, &c.

2339. And so the tax is enhanced to the consumer?—Yes.

2340. And, again, whatever the rate of profit may be of the brewer, that will also be enhanced in the same manner?—Yes.

2341. Again, there is the retailer of beer out of his house, and the retailer of beer in his house?—Yes.

2342. So that the man who consumes beer on the premises of the seller of beer will have to pay the duty enhanced, in the first instance, by the profit of the maltster, enhanced by the profit of the brewer, enhanced by the profit of the retailer, and enhanced by the profit of the publican, who supplies it at his room as a sort of club room?—Unquestionably so.

2343. Have you ever calculated what must be the difference in the price of beer in consequence of those charges arising from the malt tax?—I have often reckoned it over in this way: taking beer, which is sold at 1 *s.* 4 *d.* a gallon in public-houses, that is 4 *d.* a quart, 1 *d.* a glass, not an unusual price for beer (in our country I think it is generally 1½ *d.*, but I believe that in many parts it is sold at 1 *d.*), I believe that assuming barley to remain the same in price, you might brew that at home (which is a different thing from consuming it in the public-house, of course) for very little, if anything, over 4 *d.* the gallon, say under 5 *d.*, that is assuming that there were no malt tax, and assuming (which is, perhaps, a strong assumption) that there were no increase in the price of barley.

2344. Then it would be sold with a very fair profit at the price of 8 *d.* a gallon?—I should imagine that cent. per cent. is not otherwise than a very considerable profit. In brewing ale myself (and one can always speak better of what one has done oneself), I have not charged for my own time and attention in brewing and superintending, nor have I charged for fuel, because I have always a quantity of waste wood.

2345. Lord *Eustace Cecil.*] Have you charged for plant and building?—Plant and building cost me next to nothing. I got two or three old sherry casks, and I found that I could brew 10 gallons to the bushel at something like 1 *s.* a gallon; it varied, of course, with the price of barley and malt; but it ran from 1 *s.* to 1 *s.* 1 *d.*, and that ale is stronger than any ale that could be got in a public-house. I doubt very much whether you would get it from a brewer at 2 *s.* a gallon, and in a public-house I hardly know what it would be retailed at; probably at from 2 *d.* to 3 *d.* a glass.

2346. Sir *E. M. Buller.*] Ten gallons of that ale, you say, cost 1 *s.* a gallon?—Off and on 1 *s.* a gallon.

2347. That could not be retailed at less than 4 *d.* a quart; 1 *s.* a gallon is 3 *d.* a quart?—Yes, but then that of course is including the malt tax.

2348. But the present price of beer in the public-house is about 4 *d.* a quart?—Yes, but my beer is a very much stronger beer than you get in the public-house. You would certainly have to pay 2 *s.* a gallon to a brewer if you bought that ale which costs me 1 *s.*; with bad debts and one thing and another it is raised to that price.

2349. There is a great difficulty in comparing the strength of your ale with that of the brewer; the brewer sends out what he calls ale at 1 *s.* a gallon, and your ale costs you 1 *s.* the gallon, you say?—Yes, but they are very different things. I find that the strong beer answers for my purpose better, having a small household and a slow draught, and strong ale does not spoil or get flat; but you would certainly have to pay double that money to the brewer. The effect of the malt tax upon that beer would, no doubt, be about 4 *s.* in the 10 gallons, taking what it costs me; but if you sent for 10 gallons of ale of that strength from the brewer you would have to pay then something like 2 *s.* a gallon for those 10 gallons (that is 20 *s.*), for that which, if brewed at home, without the tax, would naturally cost about six shillings.

2350. Could you give us your own figures of the cost of brewing as you brew for your own consumption?—I have a 30-gallon copper with which we brew three bushels of malt; you may put that at 8 *s.* a bushel; then 3 lbs. of hops. I hardly know what hops are at this moment, but I should think that you may put them at 1 *s.* 9 *d.* or 2 *s.* a pound.

2351. Then you add nothing to what you charge for expense of brewing?—No, I have never done so, because I have hardly felt it. It is

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is done by my own people, and it has my own looking after.

2352. And you do not charge anything for fuel?—No, that is no expense; the yeast and the grains would be worth anything that labour and fuel would cost to us.

2353. You put that at nothing, then?—I put it at nothing, because it has cost me nothing. I am merely speaking of what it has cost me in my own brewing, where the thing is done by one's own workpeople, who would be doing something else were they not doing that. You could hardly put the price of labour upon that quantity; it would be very much in excess if you did, because the man who attended to that would brew a much larger quantity at once.

2354. If you had no malt tax, what then?—I should get my malt for 4 *s.* instead of 8 *s.*

2355. Your malt, for three bushels, would then be 12 *s.* instead of 24 *s.*, and your whole expense of brewing would be 18 *s.*, as against 30 *s.*?—Something like that.

2356. So that it enhances the cost of brewing, 40 per cent.?—Yes, that would be the effect upon private brewers. I am not speaking of public brewing, but the effect upon what you brew in your own house, for your own drinking. One is a little uncertain, not seeing it on paper; but I suppose that the ale would cost about 7½ *d.*, or something of that kind.

2357. At that rate, ale which is now sold at 5 *d.* a quart might be sold for 3 *d.*?—That is hardly so, because I am speaking entirely of private brewing, what it costs me privately to brew, and what a repeal of the tax would take off the cost of my brewing. If that ale were sold at a public-house the publican would, in the first instance, have to buy that of a brewer, and I have no experience of a public brewer's expenses.

2358. I am talking now of the cost price of beer in private brewing. The cost price of beer is enhanced now, according to your statement, 40 per cent.?—I think that it a little depends upon the way in which you put it. I think it would be, probably, decreased 40 per cent., or something like that by the repeal of the tax; but it is enhanced more than 40 per cent., certainly.

2359. According to your figures, it would come out exactly that, because your expense for a given quantity, as you now state, is 30 *s.*, and if there were no malt tax, the expense would be 18 *s.*, that is exactly 40 per cent.?—I should have said that the increase was nearer 70 per cent. If you put it that the repeal of the tax would take so much per cent. off the present cost, that is one way of looking at it. If you put it that the tax adds so much to it, that is another. Supposing that it would cost me 50 *s.* to brew a certain quantity of ale without the malt tax, and that it now costs me 100 *s.* with the tax, that would add cent. per cent. to the cost; but if you put it to me in this way, "How much it would take off the cost if the tax were repealed," it would be 50 per cent.

2360. According to your view, then, the cost price of beer is enhanced at least 50 per cent.?—I am not saying that; I am merely putting that figure, 50 per cent., for an illustration; if you double the price of an article, that is cent. per cent. increase; if you halve the price, that is 50 per cent. decrease: the proportion in this case in which the tax raises the cost is the proportion of 18 to 1 (33 minus 18). That which would cost me 18 *s.* if there were no malt tax (and barley, remained the same), costs me 30 *s.* now; that is the increase. Now 12 to 18 is more than 40 per cent.; the portion of the tax that is felt in the cost of that ale may be 40 per cent., but it is something like 66 per cent. increase upon the natural price of that ale.

2361. You compared the 12 with the 18 in one instance, and you compared the 12 with the 30 in another?—Exactly so; so that you cannot put down the increase and decrease as the same percentage. These figures, you will quite understand, are merely with regard to what it would cost a private person to brew this sort of ale for his own consumption. You may put the tax as causing nearly the same rate for the difference of cost to a cottager brewing, though he would probably use more water.

2362. Whether it is 40 or 50 per cent., calculated according to the way in which you view it, there can be no doubt that the enhancement of price to the consumer is at least 40 per cent.?—The enhanced price is at least 40 per cent.; it is a good deal more, in fact, viz., 66 per cent.

2363. It would allow a reduction in the price per quart of 40 per cent.?—If I were selling it at cost price, certainly.

2364. But even if you add your own profit, it makes no difference. I am talking of the enhanced cost price, and whether the cost price is higher or lower you have to add to that the profit before you sell it?—You have, of course.

2365. Therefore you may fairly compare the cost price with the tax with the cost price without the tax, and that would show you, to a great extent, what you would lower it by repealing the tax?—That is, perhaps, hardly so, because the malt tax more or less puts the malting or brewing into fewer hands, and therefore you get a greater increase than would be shown otherwise.

2366. Lord *Eustace Cecil.*] The monopoly makes a great difference, in short?—Yes.

2367. Sir *E. M. Buller.*] Looking only to private brewing, you have no doubt that the tax enhances it 40 or 50 per cent., and that if that beer were to be retailed the cost might be reduced from 40 to 50 per cent.; that what is now sold at 4 *d.* might be retailed at 2 *d.* or 2½ *d.*?—I think it might. If I were going to sell that ale to a friend at the cost price, assuming that to be a lawful transaction (which might be doubtful), and the question of how much I could let him have it at arose, that would be so at least, but the cost of private brewing is a different thing from the cost of public brewing, because, in the latter case, you have a certain calculation for bad debts upon the increased cost, and there are a number of elements that enter into the cost of public brewing.

2368. All that would show that the incidence of the tax is greater than the figure I have mentioned?—Yes; there is no doubt that a tax advanced by one person must be multiplied every step.

2369. You mean that a higher profit must be charged by the brewer: suppose the cost price, for instance, to be 30 *s.*, then he would have to charge more than if it were 18 *s.*?—Of course he must make his profit upon the 30 *s.* instead of upon the 18 *s.*

2370. And supposing that the average profits of the brewer were 10 per cent., if it cost him 30 *s.*, he would have to put 3 *s.* upon that?—Yes.

2371. And if you add it upon 18 *s.*, it would be about 1 *s.* 9½ *d.*?—Yes, at each step, in cases where you put your tax at an early stage, it must

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must be multiplied before it reaches the consumer. I could give you a curious illustration of that which occurred during the Russian war. I dare say you recollect that there was an increase of the malt duty then of 50 per cent. The pressure of that reduced the consumption from, I believe, 36,000,000 bushels to 30,000,000; my father was at that time consuming some tenpenny light beer in his house in London, but when that increase of duty was put on, they raised the price of that beer 2 *d.* to us. Now if you reckon that over, to see what the tax upon that beer would be, you will find that the increased tax would be something like ¾ *d.* upon the gallon; that would be the actual increase that came into the Exchequer; and to bring that ¾ *d.* into the Exchequer, it cost us 2 *d.* Now ¾ *d.* to 2 *d.* is three to eight, therefore to bring 3,000,000 *l.* into the Exchequer, would cost at that rate 8,000,000 *l.* to the public; therefore to bring 6,000,000 *l.* (which they say the tax brings now) into the Exchequer, would cost 16,000,000 *l.* The truth is, that wherever the exciseman puts his stick, there is an increased cost. I believe that what I have mentioned is not very far from the general proportion. The brewer, it may be suggested, might be a swindler, and might have charged more than he ought to have charged, but I have no reason to think so. Besides, there are other grounds for believing that if you get 6,000,000 *l.* into the Exchequer, it costs 16,000,000 *l.* to the public; that is to say, it costs you 10,000,000 *l.* to collect 6,000,000 *l.*

2372. You state that as a fact, that an increase of the duty to the extent of three farthings costs the consumer 2 *d.*?—Yes, the increase of tax would be about to that extent. I recollect the fact occurring at that time.

2373. In point of fact, you have no doubt that the repeal of the malt tax would enable the brewer to afford to sell beer at one-half the present price?—I have no doubt that the present revenue might be raised from beer; that is to say, as much money might come to the Exchequer, and that the beer which the public consumed would cost the public about half what it now does.

2374. That is to say, substituting one duty for another?—Substituting one duty for another.

2375. I was talking of getting rid of the malt tax altogether; you have no doubt in your own mind, that the effect of getting rid of the malt tax altogether would be to reduce the price of beer one-half to the consumer?—I have not the least doubt it would do that; but I believe that it would do more than that; I believe that the same amount of revenue might be raised from the product of malt, that is to say, from beer, at half the cost to the public. I mean that the beer would cost them half what it now does.

2376. You propose to raise the beer duty upon all private brewers by a license, would you not?—I should not do it by a license; my idea would be to let them return private brewing amongst the assessed taxes, as dogs used to be returned before the new plan came in; and along with the return of private brewing they would make a return of the number in the household, the tax being laid as a composition of so much a head.

2377. You would not call upon them to make a return, either of the quantity of malt used or of the quantity of beer brewed?—No, I should not; I should prefer the precedent of the private malting Act in Queen Anne's reign. You might get at it in another way, by taking the rental of the house the man lived in; but that would be partially unfair, because a town house would be more heavily charged. I think that, on the whole, the fairest thing would be to take the number of the household. A nobleman's establishment, with 25 to 50 people in it, would naturally consume more ale than an establishment with four or five only. Then you might assume that persons above a certain average age consume a certain average of beer each; that would be the fairest way, in my judgment.

2378. Would it not be possible to require each private brewer to pay for a license to brew on the average of his past consumption?—I think that that would be complicated; I do not much like the notion of a license to brew. I think we should have to ask for a license to bake next; we all do bake in our country, though they do not in other parts.

2379. I am asking about the way in which it would be practicable to raise the tax upon beer, and I ask whether the license to brew might not be upon that footing, that it should be according to the average brewing of the last two or three years?—That would be, perhaps, difficult to verify.

2380. That being accompanied with a return at the end of the year of the quantity brewed?—It would not be very easy to get at that; it is no doubt a possible process, but it appears to me that it would be a much more complicated one than the one previously suggested, and that there would be greater liability to fraud in it.

2381. Do you see any great difficulty in requiring a private brewer to take out a license according to the quantity of malt which he has consumed in previous years, and at the end of the year to return the quantity of malt which he had actually consumed in that year; of course calling upon him to pay the difference between his license of the last year and the actual consumption of the incoming year; that in fact he should pay for the next year upon the actual consumption of the year before?—No doubt it would be possible, but it would involve, I think, a good deal of very objectionable espionage, and would be a difficult thing to do. I see nothing so simple as following the wisdom of our ancestors; and I believe what was adopted in the year 1713 was a composition of so much a head in the households.

2382. I want to ascertain from you how far it is practicable to adopt, with a view of raising the beer tax with regard to private brewers, the system of licensing; whether it might not meet the case, and be carried out in such a form as to be almost unobjectionable?—I quite admit the practicability of it. I should perhaps call your attention to what was said when the subject of the license tax was, I think, introduced by Lord Henry Petty, somewhere about the beginning of the century. I know I was referred to it some years ago, I think in 1862, by an old gentleman 80 years old; he requested me to look at that when I was moving in this matter, and I referred to a debate in an old number of the "Gentleman's Magazine," and I am pretty sure that Lord Henry Petty was at that time Chancellor of the Exchequer. Speeches were then made by a considerable number of leading statesmen of that period upon the extreme undesirability of a license for private brewing. I merely refer to that as a thing worth looking to. I cannot at this moment give

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give you the exact reference. The question arose when the war duty was put on beer.

2383. In your opinion that sort of license would involve great difficulty?—It would involve difficulty; at least, I am disposed to think so; but I admit the practicability of it.

2384. Lord *Eustace Cecil.*] When that 50 per cent. increase in the malt duty was taken off beer after the Russian war, did the beer revert to the original price?—The beer reverted to its original price afterwards, as far as I recollect, the brewer was remonstrated with before it reverted.

2385. Do you think, arguing from other trades, that the brewer would raise or lower his price of beer according to the amount of tax that was put on, either the amount of malt tax or the amount of beer tax, as the case might be?—Do you mean to ask whether I think that the brewer, if the tax was increased, would increase his charge, and if the tax was lowered, would lower his charge?—Certainly I do.

2386. Would he do so according to the exact amount of the tax; do not you think that the increase of living, for instance, or increase of house rent, or increase of cost of plant, might have an effect, just as it does upon butchers and bakers at this moment?—Of course my answer should be taken *cæteris paribus.*

2387. It does not depend entirely upon the tax; it depends upon the price of living generally, the price of machinery, the price of house rent, and so on?—Of course everything is so dependent; so the price of barley depends upon seasons and a variety of circumstances; but other things remaining the same, or not varying greatly, the price would depend upon the tax, not only upon the tax directly, but upon the tax in its indirect effects.

2388. Then you think that the profits of the brewer have never varied at all; that they have remained very much the same for years past?—That is a question which I can hardly answer.

2389. You do not think that their profits have increased, at all events?—Do you mean taking the thing from century to century, or from year to year?

2390. I will say within your recollection; as far as you know, you think that the profits are very much the same as they were?—I should think that they run about the same; I have no personal knowledge, however, of brewers' transactions.

2391. I ask the question, because I presume that that fact would have a very great effect upon the price of beer?—Of course pressure in the money market might vary the profit; a hundred things might vary the profit; you can only take those things upon an average, and I do not know that there is any reason to believe that brewers have made more or less in this half century than they did the last half century. I dare say that the Burton brewers find it as profitable as Whitbreads and these great London brewers used to do; I take it they have many of them thriven well; Whitbreads and other people have made a great deal of money, and I suppose the Burton brewers have done the same.

2392. You were speaking about the debates on the subject of the licensing of beer, do you recollect at all whether it was then said, or have you ever heard since, that the expense of the collection of a tax in the form of a license upon beer would be greater than that of the malt-tax?—It would be very difficult to get a tax, in my judgment, so expensive to collect as the malt tax, if the wit of men were to try and devise one; but the licensing at that time would have been additional to the malt tax, and charged as an equivalent to the beer tax on public brewing.

2393. You do not know what the expense of the malt tax is?—My impression is that in order to bring 6,000,000 *l.* into the Exchequer, 16,000,000 *l.* at least are taken out of the pockets of the public, but what it costs the exciseman to go round and collect, that I do not know.

2394. You have never formed a judgment on the difference between the expense of collecting a malt tax and a beer tax?—Yes. I conceive that in the latter case you would do away with nearly the whole expense, as regards public brewing, because, at the present moment, you do collect what is equivalent to a beer tax, a license duty, and the same man that gets a penny might get a shilling; you would only have the expense of collecting one tax instead of two. With respect to the private brewer the difference in cost of collecting between the two taxes would not be much probably; it would cost what other assessed taxes cost to collect.

2395. You think the beer tax would be cheaper on the whole?—Yes, upon the ground that you would not be making two bites of a cherry.

2396. You said that brewers' grains were not very saleable, you thought?—Possibly not in very large quantities; they ferment rapidly, and do not keep well.

2397. Are you aware that in large towns, where there are very great breweries, grains are very extensively sold for dairy purposes?—I am aware of that, but I know that my own grains in the course of a day or two ferment rapidly, and I should conceive that unless things were made to fit very accurately, there might be a waste.

2398. You are aware, also, I dare say, that the cattle plague made a great deal of difference to the profit of the brewers, that they lost a good deal by not being able to sell their grains?—I was not aware of that; there is an old woman, a maltster and brewer, in our neighbourhood who told me she could always tell by the butter when the cows had had grains, from its improved quality.

2399. In ordinary years, do you believe that the sale of them would be a source of considerable profit to the brewer?—It would pretty nearly pay for the expense of brewing. The public brewer has an expense, besides that, in long credits, in carrying his beer out; and those in a large establishment would come to a considerable amount in the year; but for the actual mechanical cost of brewing, I believe that the grains and the yeast would pretty nearly pay the expenses.

2400. Colonel *Duncombe.*] If there was any loss to the brewers on account of not being able to sell their grains, that would be only of course in very large towns?—I should think so.

2401. But grains are a very valuable article of food, are they not?—They are.

2402. So that if it became general that farmers brewed their own beer, the using of the grains would be a very great advantage to them?—It would be an advantage; it would not be a very regular supply unless they brewed their beer once a fortnight, or oftener (the grains turn sour after two or three days), which is the practice in some parts of the country; but if they brewed once every half year they would have the grains only at that period; still they would be valuable.

2403. As far as the collection of the beer-tax is concerned, how do you propose it should be done; should it be collected in the same way that the assessed taxes are?—Yes, in private brewing.

2404. That would reduce the expense of collecting, you say?—Yes, as to public brewing; as to private brewing, I do not know what the amount of per-centage is that is allowed to the collectors of assessed taxes, I believe 2*d.* in the pound.

2405. But do you suppose that there would be any difficulty in private brewing without the continual visits of the exciseman?—I do not see how a man could brew privately without its being known; the smell of brewing is a pretty well-known smell, and every man about the place would know he was brewing. Of course there were dogs and horses kept without paying the license, but I suppose that a great proportion of them were returned.

2406. If he made a return, as is now done in the case of the assessed taxes, and stated the number of his household, that would prevent, at all events, the continual visits of the exciseman?—I should think so, because the number of a man's family would be comparatively notorious. I never heard of the Excise coming to examine into the accuracy of the return for assessed taxes.

2407. Your impression is, that the cost of collecting a beer-tax would be considerably less than the cost of collecting a malt-tax?—Yes, the actual mechanical collection would be considerably less, and the cost to the public would also be less, I am satisfied.

2408. I think you said that you tried the use of sugar in brewing?—Yes.

2409. And that you used about a pound of sugar to the gallon of beer?—Yes; I believe from a bushel of pretty good malt there are about 10 lbs. of saccharine extracted by the usual process of mashing.

2410. In that gallon of beer where you used a pound of sugar, what quantity of malt did you use?—I merely used the washings of malt. I had run 30 gallons, out of three bushels of malt, in two mashes; and when that 30 gallons had been run off the grains, I ran a third mash off those grains, of about 15 gallons.

2411. Lord *Eustace Cecil*.] But I understood you to say, in answer to a question of mine, that you had never brewed beer with sugar entirely, that there was always a certain proportion of malt?—You may brew beer with sugar entirely, if you keep adding yeast to it; but the process of vinous fermentation is one of a curious chemical change. It requires the presence of one of those bodies containing nitrogen, of which gluten, casine, and albumen are characteristic, undergoing a peculiar process of change or decomposition. You may call it yeast or ferment. In malt there exists a much larger quantity of ferment than is wanted for the actual purpose of fermenting the liquor; that spare ferment comes off the liquor, as yeast; therefore by adding yeast, you supply the ferment to a mere solution of sugar.

2412. Colonel *Duncombe*.] In point of fact, did you use no malt in that case?—It can hardly be said to be malt; it was the washings of malt.

2413. Was that a palatable beer?—It was fair, strong, warm beer, nearly as strong as the ten gallon ale, as far as I could judge by the taste. I tapped it two or three weeks ago.

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2414. You can compare it, you say, with the beer sold in public-houses?—I had got rather more hops in it than the usual public-house beer; but at the same time my steward was brewing, and he tried a little sugar with it; to brew 54 gallons, he put in four bushels of malt, which would have produced 40 gallons of ale, and 20 pounds of sugar, which, at the rate I have been speaking of, would have produced 60 gallons: that is a little stronger. I tasted it yesterday, and it gave me the impression that a good deal of the public-house ale has sugar in it, though it was stronger than public-house ale.

2415. You think that there is a good deal of sugar used in brewing the public-house ale?—I think so from the taste; but sugar being entirely soluble, and leaving no residuum as grains do, if a man pays for using a certain proportion of sugar in his beer, it is not easy to say whether he has used that or three times that; because when the sugar is gone into the boiler, there is an end of it; therefore I think that fraud might be practised in the use of it.

2416. You mentioned, did you not, a large farmer who used Mr. Gladstone's mixture for sheep?—No, he used the ordinary malt upon which duty had been paid, and used it in the shape of sweet wort, made in a large jug, for lambs when the ewes did not milk freely. He told me yesterday that he had lost no lambs since he used it, and he had been doing it for two years.

2417. Was this a mixture of malt and linseed?—No, it was the malt which had paid duty, and which he got from a brewer. The untaxed mixture with linseed is ground inconveniently fine to make a mash of. At first, he used the wort as an experiment, and has since continued it, because it answered.

2418. When the farmers of your association met together, was one of the grievances of which they complained, that they were not able to use their inferior barleys for food for cattle in the shape of malt or sprouted barley?—It was a thing they were anxious about; they would have been exceedingly glad to have been able to use malt or half-malted barley as food. It may very possibly be that malt may not be altogether so valuable as food as it is as sauce. The animals are exceedingly fond of it, and it agrees with them particularly well. You may tempt an animal to eat malt that will not eat anything else, and therefore malt is valuable, as I believe, and shortens the time an animal takes to fatten.

2419. That is one of the subjects of which the members of your association complained?—Yes, they were anxious about it.

2420. Have you ever discussed at your meetings the practicability of substituting a tax upon beer for a tax upon malt?—We have often talked it over. Of course, they say that they would rather have no tax upon beer; but we were all of us of opinion that the tax should be upon the finished article rather than upon the raw material.

2421. A tax upon beer would not be an unpopular tax, as far as the agricultural part of the country is concerned?—No, not as compared with the malt tax.

2422. You have written also upon this subject, I believe?—Yes.

2423. Do you consider that it would be advisable

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able for the interests of the country generally that the tax should be upon beer?—I am certainly not in favour of a tax upon beer, but I would much rather have a beer tax than a malt tax.

2424. Major *Parker.*] You say that you have produced 10 gallons of as good a quality of beer from a bushel of malt at a shilling a gallon, as you get from a brewer at 2 *s.*?—About that. I and my steward brewed at the same time, and he was using his in the harvest time. At 10 o'clock in the day it is the habit to send an allowance to the men, and the men sent him word that he was not to send them more than a pint of it each, that it was so much stronger than that which they were accustomed to, that he must limit the quantity he sent them.

2425. I think you also said that beer may be brewed in small quantities?—It may, undoubtedly.

2426. And without prejudice to the quality of the beer, in proportion to the malt used?—No doubt there would be a greater waste in brewing a very small quantity, but there is no difficulty in fermenting. I have fermented it in a quart jug on the chimney piece, and even in a tumbler glass.

2427. With regard to cottage brewing, can you say whether, in small quantities, beer could be brewed of good quality, without any very great expense or loss?—I am not sure whether it is mentioned in this particular pamphlet of Mr. Fielden (who is a cotton manufacturer at Todmorden), which I hold in my hand, but I have heard him say that they are in the habit of brewing five or six quarts at a time with a kettle in his neighbourhood.

2428. From your own experience of brewing beer in small quantities, a bushel or two bushels, do you think that you could produce beer of as good a quality as that which you speak of as having been got from a brewer 100 per cent. dearer in cost?—The fact is, I do not think that I could buy in the whole of my district any ale as good as my own at any price I might like to give for it; that is brewed on a very small scale, three bushels at a time. I have a small household, being a bachelor, living by myself with three servants. I sometimes take two of those brewings and ferment them together. I brew about nine bushels of malt in March, and about nine in October; therefore my experience is that of a small brewer.

2429. What is your opinion as to whether the substitution of a beer tax, with all the varied troubles and inconveniences attached to it, could be of advantage to the labourer brewing his own beer, as compared with what he now has to contend with in purchasing it?—In the first place, I think it might be desirable to limit the operation of your tax to a particular class of houses; I think that the labourers that till the ground, and the smaller and poorer classes, might very fairly be allowed to brew, up to a certain point, free. They get very little beer at present (and, therefore, what they got would be no great loss to the revenue), unless what they get casually at the public house, which is very often a very decided loss, not to themselves, but to everybody else; a man will fuddle himself now at a public-house, and get himself into a scrape, perhaps once or twice a year, whose payment to the revenue is very small. Were he free to make and drink home-brewed with his family, the revenue would hardly suffer; though the public gain from increased sobriety might be considerable.

2430. Then is it your opinion that in addition to the advantage for the labourer from the less cost at which you would produce the beer, he would also have a more wholesome beverage?—Yes, and a beverage better suited to a hard-working man than tea and coffee forced down his throat against his will, for beer is, to a certain extent, a substitute for meat. In Scotland, I have seen during the harvest men making their dinner upon a bottle of beer and a loaf of wheat bread; the main part of their food being oatmeal at other times.

2431. Lord *Eustace Cecil.*] What kind of beer was that?—I did not taste it; I was not, at that time, thinking about the malt duty, but I remember being struck by seeing men dining upon that, and making it a substitute for a heavier meal. I believe that in all flesh there is a certain stimulating substance which is by the chemists called creatine, which is particularly abundant in beef; it is one of those alkaloid bodies which have considerable nervous effect; that stimulant is what you get to a considerable extent in Liebig's extract of meat, and you get it in beef tea, but in bread you do not.

2432. Mr. *Surtees.*] I think you said you believe there are about 10 lbs. of saccharine matter in a bushel of malt?—I said I believed that about that amount may be extracted from it.

2433. Can you tell how much saccharine matter exists in 112 lbs. of such sugar as you used for brewing?—I considered that as being all saccharine; there are certain impurities in it, and water, but I have considered it as saccharine. In making the experiment that I did, I used the coarsest sugar.

2434. Does not the saccharine matter of malt pay a much higher duty than the saccharine matter of sugar?—It pays about three times the duty. Take the duty upon sugar in round numbers at 10 *s.* a cwt., a cwt. would produce about the same amount of saccharine that is obtainable from 11 bushels of malt; that would be 7 *s.* and some odd pence to the eight bushels of malt; that is just about a third of the 21 *s.* 8 *d.* which the duty now is. The duty upon the saccharine in sugar is about a third of the duty upon the sugar extracted from malt, and that is one of the things of which we complain.

2435. Do you know that there are persons called malt factors?—I have heard of them.

2436. Do they not frequently purchase malt from the maltsters and sell it to the brewers?—I should suppose that they do. In my own neighbourhood the same people who are maltsters are brewers and publicans to a great extent. I have generally bought malt of a man who is so, and therefore he gets the maltster's profit as well as as the brewer's and publican's profit.

2437. When malt factors intervene, would you not expect that they would make a profit upon their transaction?—Of course they would; but generally the large brewers are maltsters as well, I think; still though they may be so, others have to compete with them who do buy of malt factors, and therefore it would tell upon the price in that way.

2438. That being the case, there must be a per-centage upon the malt, and upon the duty, and upon the maltster's profit; that profit must tend to increase the price of the beer?—Yes; the more you turn it over the more it increases, like a snow ball.

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2439. Mr. *Read.*] You say that there is a considerable increase when you turn barley into malt?—In bulk. I have understood so; but it is not a thing which I can speak of from experience.

2440. That of course must depend very much upon the season, and the way in which the grain is harvested?—I take it, that if it were half malted already by nature there would be less increase; I think that it is given in the books at from five or six to ten per cent.; something like an average of eight per cent.

2441. In the days when Mr. Cobbett wrote, of course there was a malt tax?—There was; but he speaks of the evidence of Mr. Ellman before a Committee of this House, referring to a period when private malting was allowed for a composition, and I think it was somewhere about the year 1780; but if you have a copy of Cobbett's "Cottage Economy," I think you will find that he mentions the subject in that. Mr. Ellman said that when the private malting was allowed by composition, every cottager in his village brewed, and that not a single cottager brewed after that, and that the character of the village generally deteriorated in consequence of the public-houses, which had been previously not at all frequented. I think this was the effect of his evidence I think that Mr. Ellman gave evidence in a Committee on which Cobbett was sitting, or where he was present as a stranger in the year 1821.

2442. But of course, if what you have told us is the fact, there could be no malt tax. If a man took a bushel of barley to a maltster and received back a bushel of malt, what duty could there be?—I believe that before that period, when a man went to a public hack maltster and did that, he paid 1 *s.*, which was the duty upon the bushel, and got back the bushel of malt, and did not pay any more than the duty, because the maltster was paid by the increase. But also, at that period, there was a composition for private malting, such as I am now suggesting for private brewing.

2443. Can you tell us anything about that?—You will find it, I believe, in an Act of Queen Anne or George the First; I think about the year 1713; there was a composition of 5 *s.* a head, and the persons who paid it were allowed to malt in their own houses; and it was said that a very large proportion of the malt was so malted in private houses, so that the public return of 30,000,000 bushels did not represent the real quantity used.

2444. That might perhaps account for the curious fact that almost every old farm has a malt kiln?—We have not many of them in our own country, but then we have not many old farmhouses; our Acts of inclosure took place only about 80 or 90 years ago.

2445. When you say that the price of barley being 4 *s.* a bushel, the price of malt would be 8 *s.*, you mean the retail price of course?—I mean the price if you were going to buy it to brew for your own house.

2446. But if you were to brew it in large quantities you might get it cheaper? — Yes, probably.

2447. At 7 *s.* 6 *d.* perhaps?— Possibly you might.

2448. If there was a license in lieu of the present malt tax, you would say that it should be so much upon the rental of the house?—No, not upon the rental of the house, but upon the number of occupiers. I think that the fairest measure of a man's calibre would be the number of his household, not including children under a certain age. I think the age of 14 was the line drawn in the Act I refer to.

2449. Take a farmer; would you consider that all his labourers formed his household?—I think it should be the people who actually slept and lived in the house. If the question referred to a farm labourer living in his house or living in his hind's house, he should be considered to be included in his household; but day labourers, I should think, would not be considered included; they merely come and go, and are chance comers. You would take the actual inhabitants of the farmhouse, the farm servants and the other people who used his beer; and if his hind used his beer, the hind's household should be included also. All those living on the farm, and in the house, and who do farm work, and regularly consume the farm beer, of course you would have to include in his household; but I think that the day labourers who come and go you could not call his household.

2450. But if a farmer were to give those day labourers beer, how would you tax him for that?—I do not know; I should be very glad if they got the beer. No doubt some persons would escape under any scheme that might be devised, but probably not enough to be of much consequence to the revenue.

2451. I was putting the question to you to ascertain this: do not you think it would be much fairer for a man to brew on a license, taking out a license to brew a certain quantity of malt, say?—I think that that would be rather difficult to get at, and that it would render much espionage necessary. What you want roughly is to prevent private brewers competing unfairly with the public brewers. I should be very glad if it brought a large sum into the Exchequer; but you want it more as a protection to the interests of the public brewer, and because it would be very unfair upon him to tax his beer and not to tax private brewing, rather than for any direct revenue that you would raise from it, probably, at this moment; because private brewing has gone so much out of date.

2452. Do you think there would be much more difficulty in getting him to pay a license upon the quantity of malt that he brewed than there is in getting him to pay income tax upon his profession or business; a man would have, in both cases, to make a return?—He would have to make a return in both cases, and it is undoubtedly practicable; the only question is, which is the easier method, and I believe the other would work more satisfactorily. You must deal with things more or less roughly in questions of this kind. Of course a person who keeps a large household, and was not a great consumer of beer, a household of ladies, for instance, and maid-servants, who brewed at home, who did not drink beer, would not be as lightly taxed, comparatively, as a farmer in whose household there were a number of day labourers who took it daily at supper and dinner; I am only suggesting this as the outline of a plan. I would much rather have a license upon brewing than the malt tax, if you put it in that way; but I think that if the plan suggested would work a little

uneasily

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uneasily in some places, yet in most others it would work fairly.

2453. Do not you think that it would be more difficult to surcharge a man for brewing a larger quantity of malt than it would be to surcharge a man for making an insufficient return for the income tax?—It might not be more difficult but it remains, perhaps, to be shown that there is any means of getting at either which is at all easy; I believe it is extremely difficult, in the case of professions and trades, to get at what the incomes really are.

2454. You are aware that in the eastern counties the farmers' great consumption of beer is by the day labourers?—I was not aware that that was so.

2455. Therefore we should want to tax the beer that is given in that way to the day labourers?—Do you mean a man living in his own house and coming one day to one place and another to another to work?

2456. I mean in working from year to year with a farmer, but being, in point of fact, a day labourer?—Eating his meals in the farmer's house, do you mean?

2457. No, at home?—If the farmer allowed him malt and he brewed at home, you would charge him; if any man were constantly supplied at home, I should consider his a brewing household and charge the man accordingly. I do not think that you could get at the beer that went in casual glasses, but I should require the return for the other, unless you drew a line and excluded all labourers and said, "It is desirable that these people should brew free;" it is better for them to do that than go to the public-house;" and if Parliament came to the conclusion that the quantity they brewed would not interfere with the revenue, and was not worth collecting, those men might go free; but if you did not draw that line, I should say that a man who was supplied from another's brewhouse should pay duty, as if he brewed himself.

2458. You would, in fact, consider all day labourers to be part of the household?—I would treat in this way: if you supplied them with beer in their own households, I should regard those people as home brewers; it would not do for a private brewer to be allowed to *quasi* sell his ale to other people, because the tax would no doubt be evaded by them. If it was known that he supplied so many labourers' houses with ale, I should treat them as home brewers, but if the ale was consumed by comers and goers at his own house, I would take no notice of it. If the labourer lived on the farm and slept there, he would then be taxed as part of the farmer's household; if the farmer sent the beer to the labourer's house, I should consider him as brewing himself.

2459. During the time of the Crimean war you said that the tax was increased something like three farthings a gallon, and that the increased charge of the brewer was twopence?—Yes, upon some tenpenny beer we were then using.

2460. Was that from the enhanced price of barley at that period, do you know?—No, I do not think that the barley was enhanced in price then; as far as I remember, there were 36,000,000 consumed just before that period and 30,000,000 after that tax was put on; the decrease of consumption was so great that the increase of the tax did not produce the money that was expected from it, as I understand, and it was shortly repealed.

2461. Barley has been considerably higher since that period, and they have not enhanced the price of beer since that, I think?—Barley has no doubt, on the whole, tended to rise since that period.

2462. Do you know that within the last 12 months the price of some classes of beer has risen again?—I have heard that there has been in some classes a rise, but I do not know it further than this; that at a house which I occasionally drive to when I go to attend the bench at the petty sessions, I have been charged 3 *d.* a glass instead of 2 *d.*, that was for strong home-brewed ale: I have remarked that, certainly, but otherwise I cannot speak to the fact.

2463. You do not know whether it has risen in price?—No; except that at that hotel, at Scarborough, my next market town, they charge me 3 *d.* a glass instead of 2 *d.*, which I suppose may be in consequence of the rise of barley.

2464. But there has been no rise in the price of public-house beer or porter?—I believe that at the small public houses it is sold just at the same price, though probably deteriorated in quality.

2465. Have you any idea when that Act of Queen Anne's reign was repealed?—I believe that it was repealed in the year 1783; Mr. Ellman's evidence will tell you that.

2466. Did you say that there was an increase in the quantity of grass in your country?—When I say grass, I should explain that I mean not only permanent pasture, but two or three years' seeds. The tendency is certainly to increase grass.

2467. Mr. *Dent.*] Will you tell us any instances of that?—I know that my neighbour, Mr. Rowley, has more grass on his farm than he used to have; he has laid down some 50 or 60 acres within a few years, and he was telling me the other day that he kept his land in seeds more than he had done; the tendency is certainly in that direction.

2468. I should like you to give us some further information on that point?—I have tried to get some accurate information upon that point, feeling convinced that that was the tendency, and of its great importance, and I have not succeeded in getting that accurate information upon the question of how much more could be raised on tillage than on grass.

2469. The question is one of fact?—I understand it is so, that the farmers keep their land under two years' seeds more than they used to do. I cannot speak of my own knowledge, though I have laid down little bits of land myself. They are nothing worth mentioning, but I hear it talked of; I offered a tenant of my own, to pay him half the bill for grass-seeds if he would lay down a 12-acre field to grass, as the thing was an experiment, and he consented to it. It was intended to be done; but when the time came he had not got his land sufficiently clean and in sufficiently good order, he thought, to lay it down satisfactorily, and the thing was put off, and it will probably be done in the next course of cropping. I have already stated, I think, that I heard yesterday that the late Mr. Bates's property at Kirk Leavington is all being laid to grass at this moment.

2470. Mr. *Read.*] Is this light or heavy land that thathas been kept in two years' seeds generally?—I cannot tell you; I merely heard this as talk from the men that came to the meetings when we were moving about the malt question, and elsewhere. I have casually heard, from their talk, that there was a tendency for land to go to grass, or two or three years' seeds, when corn is below its natural price.

2471. There would be less corn and less wheat produced from that land?—There would be less corn and less wheat produced.

2472. Have you ever turned your attention to the Irish statistics?—Yes; for a considerable number of years the process went on in Ireland exactly as I have been describing it; that was one of the first things that drew my attention to it. I have been engaged upon other matters for some time, and am not as fresh at that as I should have been a year or two back. But what happened in that case was this: that for three or four years after the year 1862 (my attention was particularly called to the subject at that time by a proposal to put a license upon brewing) I remember observing that in Ireland grass increased at the rate of about 100,000 acres annually, which went out of active cultivation and into long seeds or grass, or ran to waste; and there was a decrease of about 300,000 stock annually. After a certain period, about two years ago, a re-action has taken place, and the cattle is increasing in head. But then what I would call the attention of the Committee to especially is, that that does not show anything very accurately; it is a very difficult question to get at. I am given to understand that the increase has taken place in much younger stock than that previously held, and that therefore the apparent increase of head of stock, in the last year or two does not show the increase in the produce of beef which it would appear to show. Your head of stock does not show your amount of beef, because your stock may be decreasing in size; and we all of us know that the Irish beasts in the market come to us a year younger than they used to do; that I have heard farmers constantly speak of.

2473. When you put the cost of private brewing at nothing, of course you must be at a certain amount of inconvenience and expense?—One brews for oneself.

2474. You do not always get good beer, I suppose, when you brew for yourself?—It is a very simple thing; it is as simple as making tea, if you have a thermometer and brew at the right time of year; the only difficulty I have had is that some ale I have had has been longer in clearing; one may have had to drink rather muddy ale, but it always has cleared with time enough, and always tasted right.

2475. Have you directed your attention to the question how much per head you would recommend upon the household for permission to brew?—It is difficult to get at that; it was 5*s.* a-head in the Act of Queen Anne, but then the malt duty has more than quadrupled since that period; the actual consumption, however, is about the same. If you were to charge upon the present consumption 5*s.*, if 5*s.* were enough then, 5*s.* would cover the average consumption now; I think 5*s.* might be a very fair compromise.

2476. Mr. *More.*] What is the general effect of the beer tax upon the price of beer?—Comparing it with the malt tax I am inclined to think that you would very much decrease the price of beer by taking a beer tax instead of the malt tax.

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2477. Would the amount of private brewing affect the price of beer to any great extent?—Supposing (which I believe would be the case) that people took to brewing again, as they used to do, you would have more competition with the public brewer.

2478. Do you think that private brewing would be very general if the malt duty were repealed?—I believe that people would gradually revert to it.

2479. Do you think that the present profits of brewers are very enormous?—That is not a question which I can speak to.

2480. When the hop duty was repealed, and the tax put on brewing, did they raise the price of beer in consequence?—I am not aware that they raised the price of beer.

2481. It must have been a considerable loss to them?—I do not think that it came to so much loss as it might have been, because it only affected the competition of the private brewing; it would not raise the cost of brewing to the public brewer, because previously he had to pay hop duty, which this tax freed him from.

2482. I want to know in that case whether, although the substitution of a tax upon brewing for the hop duty was a loss to them, yet, notwithstanding their profits were so enormous, that they found it unnecessary to raise the price of beer?—I am not aware that it was a loss; formerly they had to pay the duty upon hops.

2483. When the Yorkshire farmers discuss the question, do they generally go into the substitute part of the question?—We have often had it before us, but we have never treated it as a producer's question. The truth of the matter is, that the farmers in my neighbourhood understand perfectly well that they are partly compensated in the price of their beef for the lower price of their corn, and therefore they do not treat it distinctly as a farmer's question.

2484. Is a beer tax the only substitute for the malt tax, in the opinion of the Yorkshire farmers?—We have made up our minds that we would rather have a beer tax than a malt tax, if we must have one of them.

2485. You generally advocate the repeal, without considering at the same time the question of how the revenue should be made up?—We have considered it advisable in working the question to simplify it to that extent; but we have agreed amongst ourselves that the right course would be to put the tax on as a beer duty, in preference to a tax upon malt.

2486. Mr. *Goschen.*] Whom do you mean by "we"?—I speak now of the members of the Yorkshire Association for the Repeal of the Malt Tax. When we have talked it over, we have generally agreed that it was desirable that we should have a beer duty rather than a malt duty. We should, of course, very much prefer not to have any duty upon beer at all.

2487. The *O'Conor Don.*] I think you stated that you had observed that the quantity of grass land in Ireland had greatly increased of late years?—It had considerably increased up to two or three years ago. I have not been paying very distinct attention to that lately; but I understand that it has decreased within the last two years. The grass land had increased certainly up to a few years ago.

2488. Do

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2488. Do you see any connection between that and the malt tax; have you considered whether that is in any way due to the malt tax?—No doubt the malt tax has exerted a pressure; but what I consider has given it an additional weight to that pressure lately has been the increase of spirit duty in Ireland, which of course presses in the same direction. Sir Patrick Nugent, I remember, told me that he gave evidence to a Committee on that subject some few years ago, in which he pointed out that the increased pressure of the spirit duty acted upon Irish cultivation, as I have been explaining the malt duty does upon the English.

2489. Therefore you would naturally conclude that if the malt tax duty were remitted in England, the spirit duty ought to be remitted in Ireland?—Not necessarily to the same extent. The repeal of the malt tax would relieve agriculture in both countries, but in Ireland the spirit duty, in my belief, has been increased beyond the good of the public.

2490. You are aware that they do not grow barley much in Ireland, and that they make spirits largely from oats?—Yes; and ale may be brewed from oats.

2491. Do you know anything of wheat ale?—Wheat ale is not at all bad ale; there is a difficulty in clearing it, I have heard. I fancied that there was much inferior barley grown in Ireland, of which it is impossible to make ale, because of the pressure of the tax.

2492. Oats succeed better than barley or wheat in the damp climate of Ireland?—Yes.

2493. You say that the quantity of cattle in Ireland has increased, but you believe that they are of a younger description than formerly?—The Irish statistics showed up to about two years ago that there had been a decrease taking place in stock; that is, in cattle, sheep, pigs, and horses. Since that period I have found that the Irish statistics show an increase; but what I say is, not that they are younger, but that we do not know (because the statistics do not show) whether they are younger, or what the age of the animals are. We know, as a matter of fact, when we go to the market to buy Irish beasts, that they are now a year younger than they used to be; therefore we think it probable that the increase which has taken place may be an increase of young beasts and calves.

2494. Did I understand you rightly to say, that if the malt tax were repealed, you thought the number of private brewers would increase?—I think it would.

2495. You stated, in answer to Sir Edward Buller, that a great disadvantage existed at present to the consumer of beer in consequence of the additional charge put upon the beer in every hand through which it passed; that is to say, when it passed from the maltster to the brewer, and from the brewer to the publican, and from the publican to the retailer, upon every transfer there was an additional disadvantage to the consumer in consequence of the malt tax?—Certainly.

2496. Is not that disadvantage an inducement to private brewing at present?—No doubt it would appear to be so. But the way the thing operates is this: but for the tax the cottager and the farmer would not only brew, but would malt their own barley; that is not a difficult thing. I believe that the interference of the malt tax in the first place takes the barley out of their hands; maltsters' and retailers' profits raise the price to such an extent that cottagers do not brew. They cannot, at the price of malt, afford ale for their families, or get any regular supply of malt liquor. When driven by a craving to the public-house, they get more than is good for them, and what they get there is too often not pure.

2497. You consider that besides the brewing, they would revert to an increased malting of their own barley?—Yes. I think that the decrease of private brewing took place upon the prohibition of private malting.

2498. You stated to Mr. Read that whenever the farmer gave beer to labourers not living in his house, you would, under your proposal of a beer tax, charge these labourers as if they brewed the beer themselves?—I mean by that, when a farmer supplies a labourer with beer in the labourer's own house. If one person in the parish brewed beer, and by private arrangement supplied all his neighbours, that I should conceive to be a fraud upon the revenue, because his composition would be for those of his own household. Beer given to casual comers and goers I should not charge for; but where you actually send beer into a man's house, a cask of ale, say, which is what I understood Mr. Read to mean, I should conceive that to be the same as the man's brewing.

2499. I understood Mr. Read to mean a farmer giving labourers' beer in the fields, men working regularly for him?—I understood Mr. Read to mean that the habit which he asked about was to supply labourers in their own houses with a certain ration of ale; that they kept it in their houses, and that they drank there as they pleased.

2500. How would you have the beer tax levied upon the beer given to the labourers in the field?—It would be quite an exceptional case; and if they were neglected, it would not probably do do much harm to the revenue.

2501. You would be surprised to hear that it is a practice very general in parts of the country?—It might be so in exceptional cases.

2502. You have not considered that point?—I have not.

2503. You consider it to be insignificant?—I consider that insignificant in the question very much as the cider is insignificant; that is one point which I have never been able to get at, what effect the consumption of cider has upon the consumption of ale and spirits in the cider counties.

2504. Mr. *Read.*] It does not signify for the purposes of taxation, whether these labourers drank the beer in the fields or in their cottages?—If it were in the cottages that it was drunk, it would be drunk also by the families; and if you treated that as private brewing, you would charge a composition upon the labourer and his family.

2505. *The O'Connor Don.*] You consider the malt tax a very expensive one as regards the cost of collection; do you know what the per-centage is?—No.

2506. Then you stated that it was expensive in collection, without knowing what that cost was?—I should explain that, when speaking of its being expensive in collection, I am not referring to the expense of the Excise in collecting it, but I am referring to the increased cost to the public; that, as I believe, in order to bring 6,000,000 *l.* into the Exchequer, it costs about 16,000,000 *l.* to the public; I therefore say it costs 10,000,000 *l.* to the

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the public to get the tax. With respect to the other part of the question that I was asked by Colonel Duncombe, as to the comparative cost of the collection of the beer duty, and the collection of the malt duty, I merely put it as high as this: that it must cost something to collect the malt duty, at present on public malting, and that that something, whatever it is, must be avoided, as far as public brewing is concerned, by the beer duty, because there is a beer duty collected already.

2507. If you have a beer duty you would have to collect the tax from the private brewers also?—Yes; that portion would be collected at a cost of 2 *d.* in the pound with other assessed taxes.

2508. Mr. *Cave.*] Your idea, I think, is, to collect a beer duty from all private brewers?—I should collect it in the nature of an assessed tax.

2509. And exempting, I think you said, from it inhabited houses below a certain quality?—I merely threw that out as a possible suggestion it might not be considered worth while to interfere with them, but that it might be thought better to let the poorer labouring classes go free. I do not state that as a proposal of my own; I merely throw it out as a suggestion worth considering when the subject has to be dealt with.

2510. When you levied the duty upon houses above that class which you suggest might possibly be exempted, do you think that it should be on all houses, or only on houses where brewing goes on?—Only on houses where brewing goes on; I should have the return to be, "brewing or no brewing—yes or no;" and the number of inhabitants would only be returned in case of brewing.

2511. Would you send the exciseman to every house to see whether any brewing went on?—No, I should treat that as we do the other assessed taxes; no exciseman usually visits to ascertain that assessed taxes are not evaded. All the dogs that existed were probably not returned, and all the horses that existed were probably not returned, but practically you did get the bulk of them.

2512. In the case of the dogs it was found necessary to alter the law, in consequence of fraud, was it not?—Yes, but not as to horses or carriages.

2513. But in the case of a farmer paying part of his wages in beer, you would make him include those persons to whom he paid that in his return?—I think that those persons should certainly be included in the household; I mean when the beer was given for permanent wages; but if a man comes to my house to do a day's work, and I give him a glass of beer, that is beyond the bargain.

2514. But if the farmer paid money instead of beer, and the labourer brewed at home?—Then the labourer would pay.

2515. Do you think that people would brew from oats in case the malt duty was taken off?—Yes; I do not see any reason why they should not; they cannot now, because the saccharine contained in oats is so much smaller, it is not worth paying duty upon. I have heard of oats ale being made, and that it is exceedingly good and pleasant ale.

2516. Would there be any chance of that reducing the price of barley?—My impression is not; I should think that all grain would rise in price; some other grain must take the place of the excess of barley that would be used for malting.

2517. You have used sugar for brewing?—I tried the experiment.

2518. Did you pay duty upon it?—Not in private brewing; the public brewers pay.

2519. You take 210 lbs. of sugar to a quarter of malt, and according to that you pay duty?—Practically, about 10 or 12 lbs. of sugar is equivalent to the bushel; you would make something like 80 or 90 lbs. in a quarter; that I believe to be about the strength. I believe that they pay about 3 *s.* 6 *d.* in the cwt. extra, and that I believe brings the duty up to about half the duty upon the malt, something like that. You may consider, in fact, that 10 or 12 lbs. of sugar is about equal to a bushel of malt for giving strength to the ale. I do not say that it is equal to the whole saccharine it contains, but to what you get out of it.

2520. Mr. *Dent.*] On this question of land going out of cultivation, or rather being put under grass crops, are you aware that it has been the custom in Northumberland and the border counties, constantly to keep land in seeds for years?—I am aware that it has been so in Scotland, but I did not know that it was so in the border counties.

2521. Do not you think it is possible that where they are doing that, they are doing it, because they have found it an advantageous system?—I have no doubt that they have found it to be an advantageous system, and they have found it to be so, because grain has been kept by taxation at an unnaturally low price.

2522. In what way do you mean that grain has been kept by taxation at a low price?—By the pressure of the whisky tax and the malt duty.

2523. Have you not heard, on the other hand, that it is not infrequent in the present day for farmers to be allowed to take two white crops in succession?—I know that, in some instances, they do take a crop of barley after a crop of other corn; but that requires very particularly good land.

2524. And good management?—Yes.

2525. And plenty of capital putting into it?—Yes.

2526. Do not you think it is quite as probable that there is more land put under corn in that way than is taken away from corn by being put under seeds?—What I was pointing out was, not that the land would not produce so much corn, but that the grass land would produce less stock.

2527. You state that the farmer is laying his arable land down to grass, or letting it remain under seeds. I question that, from my experience, and I say that you have given us no examples to prove it?—You cannot prove it in that way until you have agricultural returns; and I very much doubt last year's agricultural returns being given accurately.

2528. But, according to the agricultural returns here, there are 7,400,000 acres of land under corn crops?—I recollect hearing, at the time when those returns were made, that some people did not get any papers to make the returns on, and therefore it was a very uncertain return. I have heard that the thing is being done, and I am perfectly satisfied that the thing is being done, but practical farmers are the men who can speak to that.

2529. If you are satisfied that it is done, surely you can give us an example of it; because I am perfectly satisfied that, in the part of Yorkshire

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which I am acquainted with, it is not being done, but that, on the contrary, there is a large increase of the crops of grain grown, from the fact of farmers growing two white crops in succession?—I am pretty sure that Mr. Grey, of Hexham, was the first person (and he is a pretty well-known agricultural authority) that led me to come to this conclusion; I mean something which he wrote on the subject. I am quite certain that I can let grass at a larger price than I can let the same land at when not under grass. It is not land that will bear two white crops that goes to grass and seeds so much, but the poorer soils.

2530. Mr. *Goschen.*] Do you look upon the malt tax as a farmer's grievance?—I do not specially as a farmer's grievance; I think it is a public grievance.

2531. How do you account for its being taken up by the agricultural interest?—The fact is that they have taken it up extremely lukewarmly in my neighbourhood.

2532. What interest is it that chiefly has taken up the grievance of the malt tax?—It has been taken up certainly mainly by farmers, but but by exceptional farmers; it has not been the general rule among the farmers near me; they have constantly said to me, "We do not think anything about it."

2533. You look upon it in the point of view in which it affects the consumer?—I think that the grievance to the farmer is more an indirect grievance in altering the course of cropping than a direct one; but of course he suffers also by the increased price of ale as a consumer.

2534. You look upon it not especially as a farmer's grievance, then?—I must confess that I have regarded it as rather an insult to the farmer to lay it upon him; because I consider that he is treated exceptionally in regard to barley, barley being the thing he grows better than anybody else. No other class is so treated; but I think that the farmer is partly compensated by the increased price of meat and wool.

2535. You think that the farmer is compensated for the malt tax, and that it does not cost him anything, in fact?—You derange his course of cropping, and it is more the derangement, in my opinion, that hurts him than the direct action of the tax.

2536. But it is an insult to the farmers, as I understand you, to suppose that it is a special grievance upon them?—I think the malt tax is upheld by many with a view rather to decrease the price of grain, rather than for the purpose of revenue, and in that way I consider it as an insult to the farmer. The obvious and apparent operation of the tax is to depress the price of grain, but I think he is in part compensated for that by the increase in the price of wool and meat.

2537. If the subject were properly understood, the big towns ought to take it up as much as the agricultural counties, you would say?—I am fully of that opinion.

2538. Therefore the politicians have not to consider the incidence of the tax upon any special class, but to compare it with other taxes upon the consumer generally?—I regard it as more a consumer's question than a farmer's, though the farmer is apparently first charged with it.

2539. You think that a beer tax, which you collect from an infinitely larger number of persons, would cost less to collect than the malt tax, which is collected from comparatively few?—I do, as respects public brewing, because you already collect a beer tax.

2540. Can you state how the malt tax interferes with private brewing?—With cottagers' brewing? Simply by increasing the price of malt, and preventing them from malting their own barley in their own houses.

2541. Why should they not pay the price of the malt, if they would otherwise have to pay exactly the same amount of money in a license; if they pay it in one form or another, what difference does it make to a man whether he has to pay so much more for his malt, or whether he buys it at less and pays the license, supposing that it amounts to the same in both cases?—I do not think that it would amount to the same in both cases. In the first place, if he paid a composition on his present rate of consumption, he would be unlimited in his consumption, and that would be a thing that the whole of his family would get the benefit of; at present the family gets no malt liquor.

2542. Therefore he would not pay the same if the tax were unjustly adjusted?—He would, in fact, pay quite as much as he now pays to the revenue; but he would not pay, as he now does, the profits of maltsters, factors, and brewers; but no doubt, having compounded once for the tax, he naturally might consume a considerably larger amount, but the revenue would not suffer.

2543. Then you assume that he is to pay a lower amount for his license than he has to pay for his beer?—You would allow him to consume more, as you did in the case of a man who compounded for his assessed taxes.

2544. If you are to raise the same revenue and you are to allow for that, and put it so much higher in order that you may get the same revenue by the one as the other, in what way has he to pay less?—He would pay less in proportion to the quantity of ale; there would not be a loss to the revenue; he and his family would drink more ale, which I think would do them a great deal of good, for they get little enough at present.

2545. The profits to brewers is not a sufficient inducement now to induce the cottager to pay the tax and brew his own ale in his own house; the temptation is not sufficient now?—I think that the difficulty is this: the barley is taken out of his own hands to the maltster and he loses sight of it; it is not only the cost of the duty to him, you would reduce it to him in the proportion of 2*s.* 8½*d.* to about 4*s.* or 5*s.*

2546. *Chairman.*] What is the retail price of a peck of malt?—I cannot tell you what it is; of course it is more than buying it by the bushel or the quarter. Therefore he is specially pressed upon when he brews it in his own house. Probably were he to pay as much duty to the Exchequer as he pays now, the duty would only be half to him then of what it is now. I should think that the duty doubles itself to him at present.

2547. Mr. *Goschen.*] You estimate the total expense of cost of collection of the malt tax to be 16,000,000 *l.*?—No, not the cost of collection but the tax, plus the cost of collection.

2548. The tax is about 6,000,000 *l.*?—The tax that gets to the Exchequer is about 6,000,000 *l.*

2549. And it costs 10,000,000 *l.* to collect that?—It costs the public that.

2550. Where does the other 10,000,000 *l.* go?—

It

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It goes in Excise interference, and into the brewers' and maltsters' profits, which they have to get upon the tax, and which they have to advance so many, many months beforehand; and to the monopolists.

2551. You assume that it is nearly 200 per cent. in profits altogether?—The ale which is retailed at 1 *s.* 4 *d.* a gallon could be brewed at home at about 4 *d.*, were it not for the malt tax and its consequences. I conceive that that ale could be retailed at 6 *d.* a gallon, if the thing were free.

2552. You say 1 *s.* 4 *d.* a gallon: how much out of that do you put down as malt tax at present?—It is a little difficult to know how to take the question; do you mean the tax that gets to the Exchequer?

2553. No, I mean the addition due to the malt tax, including everything?—I consider that the cost of that ale would be 4 *d.* a gallon, if there were no tax upon it, and I consider that 2 *d.* a gallon would cover the retailing of it: that is 50 per cent. on the cost price, that is 6 *d.* altogether; I therefore conceive that the additional 10 *d.* is caused, I will not say altogether directly by the malt tax, but by the malt tax and the monopoly arising from it, and the interference of the Excise.

2554. You assume that it is not through the brewers' monopoly, and through the large establishments, and through the cost of brewing, but that it is through the malt tax; it is not through the general system of the large breweries, and the profits made by brewers; but if the malt tax were swept away you believe that the price per gallon of beer per gallon could be reduced from 1 *s.* 4 *d.* to 6 *d.*?—I think that the public-house licensing system, and all that, adds to the price of beer and deteriorates the quality; but that the natural price at which beer could be retailed is, I believe, what I have stated.

2555. Do you consider that a fair way of making the comparison, to compare the cost of 4 *d.*, which you say is the cost of brewing at home, with the 1 *s.* 4 *d.*, and to put down the whole of the difference, except the 2 *d.* to the malt tax?—No doubt the monopoly of beer goes into that also; but the malt tax is the chief cause of the monopoly.

2556. You would modify that answer, therefore?—The whole system, that makes it more strictly a monopoly, adds to the cost of the beer, or deteriorates the quality. I put it, in answer to a previous question, generally to the pressure of taxation and monopoly arising from the tax on malt, and say that you get that amount of taxation out of the public.

2557. Then you think it is conceivable that now, the tax being upon malt, a man buys as beer from the public-house at 1 *s.* 4 *d.* a gallon what he could brew at home and still pay the malt tax, if he merely paid it on the malt, at 6 *d.*?—He does not brew it for 4 *d.* or 6 *d.* at present; it would cost him about 8 *d.* at home because of the tax.

2558. The difference then would be this, that at present, by the incidence of the malt tax, he pays, according to your theory, 8 *d.* more, and that difference of 8 *d.* is not enough to induce him to brew at home; but if you could make the difference 10 *d.*, by reducing the cost to 6 *d.* instead of 8 *d.*, then it would be inducement enough?—I am inclined to think that if the malt tax were repealed he would return to the old process and brew at home. It is difficult to say why a thing takes place sometimes; but I believe it is perfectly established, by the evidence of Mr. Ellman, that when that Act allowing private brewing was repealed, cottage brewing generally ceased.

2559. You say that the man pays now 100 per cent. more than he need pay, even if he were to buy the malt with a tax upon it?—I brew ale myself at home, which costs me 1 *s.* a gallon, which would certainly cost me 2 *s.* a gallon from the brewer. I am not of course charging for my own time, but being anxious about this question, I did it myself with my own hands.

2560. If the malt tax does not prevent you from doing it, does not that show that there must be other causes at work besides the malt tax which prevent people from brewing at home?—I do not know that it proves anything of the kind; I know that when the malt tax was put on private malting, the home-brewing was stopped also.

2561. How long is it since private malting was given up?—I think it was something like 1783.

2562. About 90 years ago, in fact?—Yes, about that.

2563. And therefore you think, that if the malt tax were removed, people would go back to the customs of 90 years ago?—I think so in this respect; there is a natural taste for good beer, and that they would certainly brew at home if they could afford it.

2564. Why do they not brew at home if they could do it 100 per cent. cheaper?—It is, perhaps, difficult to say why they do not, but we know that they do not. The reason why they do not in my opinion is this, that instead of a man taking his own bushel of barley, and malting his own barley upon his own floor, and drying it in his own oven, he has to go to a maltster and pay hard money and buy it at a heavy retail price; besides his own barley may not be a maltster's sample, though quite fit to malt if the tax were compounded for.

2565. This relief would tell chiefly upon the cottagers then?—It would be a very great boon to cottagers.

2566. But the cottagers have no barley of their own?—In my county they have nearly all cottage gardens, and grow the barley that now feeds the pig. I think upon my own property there are 39 quarter-acre lots let to all the labourers in the parish. Where a man had barley himself, he would certainly brew at home if he could do it.

2567. Has private brewing decreased in your own recollection at all?—I can hardly say that it has. I think that the houses that brewed in the neighbourhood brew still.

2568. Would you tell me the number of the association which you represent?—I cannot tell you offhand; I know that we collected something like 200 *l.* one year as a subscription to work the thing.

2569. It is a numerous association, is it?—It is a considerable body.

2570. Are the members mainly agricultural?—We have mainly agricultural members, no doubt; we have one member who is a large corn-factor in Wakefield, a Mr. Simpson; he started a subscription for the association himself with 100 *l.*, and we have Mr. Fielden, of Todmorden, who is a cotton manufacturer, and some others not farmers.

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2571. Do you find that the cotton manufacturers generally support the association?—We have been working in the big towns, but the question has not taken the hold which it would take if they understood how it presses upon them.

2572. Are you aware whether there would be considerable prejudice amongst the farmers against the excisemen coming to examine how much barley was brewed, in case of the beer tax being imposed?—No doubt there would be; but I would not suggest that the exciseman should come, but that it should be treated more as assessed taxes are treated.

2573. But in the case of the assessed taxes, a man does come to watch how many horses are kept?—I am not aware of that; I am suggesting taking the number of persons in the household to be a very much more convenient scheme than taking the quantity of malt. You might easily shuffle about the quantity of malt you brewed, but you could not well evade stating the number of people your household consisted of.

2574. You leave open the quantity supplied to day-labourers in the field?—I was not aware that that was the habit to any great extent, except in haytime and harvest, but I think that by considering the thing, that might be dealt with.

2575. Your plan would be, applying the same kind of system as the income tax?—The ordinary assessed taxes, rather.

2576. In the assessed taxes you have something to see; there you can see what a man does?—You can see the number of a man's family, and you can see the fact of his brewing.

2577. But you do not know whether he does not supply his labourers; whether two, three, or four cottages do not go together, and one of them only pays the license?—No doubt everything may be evaded. I have known attempts to retail beer without a license under the present system; you cannot contrive a thing so perfect as not to be evaded occasionally.

2578. Generally speaking, the fewer people you have to collect the tax from, the less liable to evasion it is, because there are fewer people to watch?—Doubtless that is so.

2579. *Chairman.*] Still if it is a benefit to collect it in a different way, you see no great objection to its being collected from more people, rather than from the few?—I think the benefit would overbalance the inconvenience; but, on the whole, I think that there may be a class who might be allowed to malt and brew free without much loss to the revenue, particularly those who are below the line of voters, on the principle that those should not pay taxes who do not have anything to say in the spending them.

2580. Mr. *Goschen.*] I suppose that in boroughs the consumers of beer would have to pay it, because there there is household suffrage?—We have not got that yet; my idea would have been to take the 10 *l.* line; but of course this proposed change, if it takes place, would require some other line to be taken.

2581. On the whole, as no one would brew in towns so much as in the country, the advantage would be to the country?—But if they did not brew they would not be touched.

2582. They would have to pay so much more upon their beer for us to get the same revenue as the agricultural labourers, who would be free of the tax?—No; the agricultural labourer would pay to the revenue what he now does by his composition. All classes would buy beer at half its present price, and the towns would not be touched by the composition if they did not brew.

2583. Mr. *Read.*] Will you tell us how the malt tax increases the price of beef?—I believe that it decreases tillage, and increases grass, and therefore lessens the produce of beef.

Thursday, 11*th July* 1867.

MEMBERS PRESENT:

Colonel Barttelot.
Sir Edward Manningham Buller.
Lord Eustace Cecil.
Mr. Dent.
Mr. More.
The O'Conor Don.
Major Parker.
Mr. Arthur Peel.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

EDWARD S. CAYLEY, Esq., recalled; and further Examined.

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2584. *Chairman.*] I THINK you said the other day, that, as a general rule, it would be no benefit to the farmers to repeal the malt tax?—I hardly said that; but I have not seen the notes of my evidence, and therefore I do not know what I may appear to say. What I meant to say, and what I do say is this, that considering their interest in it, they do not seem to me, in my immediate neighbourhood, to care so much for it as they do in many neighbourhoods. I know that many counties are enthusiastic for it. Perhaps one reason why we are not is, that we have some considerable districts of moor. The district between Scarborough and Whitby, to the range of Hambleton Hills, is a moor district; so also is the north-west of the North Riding about Wensleydale; these are breeding and feeding districts, containing much grass, and butter and cheese districts.

2585. You mean then that in your district they do not care so much about the subject as in other districts?—They do not in my immediate district; but on the Wolds in East Riding the farmers do care about it, and we have our main support from that district.

2586. But you have heard, probably, that in the eastern and other counties the farmers make a great point of it?—Yes.

2587. I think you were asked several questions about cottage brewing, and I am not quite sure what you said upon that point, but the question which I wish to ask you is this, whether you do not know that cottagers buying malt at a retail price pay very much in excess, even of what the wholesale price would be?—I have heard so, but it is not within my knowledge, because they do not brew in my district; they do in the western part of the county; I have seen brewing in the cottages there, but that is not in my immediate neighbourhood. It is not within my own knowledge that they do pay a high retail price for malt, but I should think it probable.

2588. You think it would be a great boon to all classes that the tax should be collected upon the manufactured article, rather than upon the raw material?—I do certainly think so; I think that the farmer would get his share of the advantage with other classes, but I do not think that he is so specially interested in the matter as many people think he is; at any rate in my district. I may add, that I can give a date now which I could not give last time. The Act of Queen Anne, allowing private malting on payment of a composition, was an Act of the 12th of Queen Anne, 1713. The gentleman who gave evidence on it was Mr. Ellman, and not Elwes, as I thought last time. He gave evidence before a Committee of the House of Commons in 1821, and the evidence was to the effect that 45 years before that date, every labourer brewed in the parish of Glynde, and the permission to malt for private consumption ceased in the year 1783.

2589. Mr. *Read.*] At the conclusion of your evidence last time I put this question to you: "Will you tell us how the malt tax increases the price of beef?" and your answer was, "I believe that it decreases tillage and increases grass, and therefore lessens the produce of beef:" perhaps you will explain that further?—I adhere to that statement. Grass carries less stock than tillage, and therefore that which tends to decrease tillage and increase grass (by which term I mean to include two or three years' seeds), would tend to decrease the amount of stock produced. Grass land, it has been fully acknowledged, carries less stock than the same land would in tillage.

2590. But although that might decrease the production of beef, surely it is no benefit to the farmer?—I do not say that it is a benefit to the farmer, but he gets a larger price for the beef which he does produce.

2591. But if that larger price is simply the result of some restriction on the cultivation of land, surely that is no benefit to the farmer?—Of course not a positive benefit; still if a man gets less for his corn and more for his beef, in consequence of the tax, he is better off than if his corn was depressed and his beef not raised in price. But I was more referring to the breeding and grazing farmers, who had got into the way of dealing with grass and seeds more than tillage, and it is they who are chiefly compensated, or think themselves so.

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2592. It would be a benefit to the grass farmer rather than to the arable farmer?—The compensation I speak of would help the grass farmer, apparently, more than the arable farmer; I doubt its really doing so; I mean that I believe that both classes would really gain by the repeal of the tax, especially indirectly. There was a question asked last time about adulteration, and I should like to point out to the Committee a curious fact connected with that, which is this: the population in England and Wales was about 5,000,000 in 1715 to 1720; it is now, I believe, 20,000,000 in England and Wales; that is to say, the previous number is multiplied by four. Now the consumption of malt in England and Wales about the same period was very nearly the same as it was four or five years ago, and including private malting, quite as large; it may have increased lately, but within five or six years ago certainly it was very little increased; consequently there is only a fourth part of the malt consumed a head now (I mean four or five years ago, for I cannot speak of the last few years) as there was then. But it was stated by Mr. Gladstone a few years ago, that the same quantity of beer a head was consumed now that was consumed then. It would follow from that, if those figures are correct, that only one-fourth part of that beer is made of malt. I have given the other facts mainly from Ford's Malt Trade and Laws, a well-known work of authority upon this subject.

2593. Lord *Eustace Cecil.*] You have nothing more to state about the adulteration of beer?—No. I only stated that fact as rather a curious one bearing upon the subject, supposing (as I assume) those figures to be correct.

Monday, 22*nd July* 1867.

MEMBERS PRESENT:

Mr. Ayrton.
Colonel Barttelot.
Sir Edward Manningham Buller.
Mr. Stephen Cave.
Lord Eustace Cecil.
Mr. Dent.
Colonel Duncombe.
Mr. More.
Major Parker.
Mr. Arthur Peel.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

Mr. CHARLES HIGBY LATTIMORE, called in; and Examined.

Mr. *C. H. Lattimore.*

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2594. *Chairman.*] I THINK you live in Hertfordshire?—I do.

2595. You live at Wheathampstead Place, I think?—Yes; that is the name of the farm at which I reside.

2596. Near St. Albans?—Near St. Albans.

2597. And I think you occupy about 360 acres of land, part of which is your own, and part of which you rent?—Yes.

2598. I think you farm that land on the four-course system?—Yes.

2599. And I think you fat out a large quantity of stock?—Yes, it is the support of the land; without stock feeding it would be of little value.

2600. I think you fat out a thousand head of stock?—A thousand head of stock every year for the last 20 years.

2601. Do you call yours a barley farm?—Yes, it is a barley farm; but it is not land that grows the best quality of barley.

2602. Can you grow the best quality of barley?—Very rarely; the crops are generally too large, too bulky, and they get down; they grow too quick.

2603. That is from good farming?—Yes.

2604. Not on account of the land?—No; without the stock feeding and so forth, it would be very poor.

2605. Then I may take it for granted that you grow a large quantity of what may be called inferior barley?—Yes, we do.

2606. What effect do you think the malt tax has upon the best classes of barley?—The malt tax causes the best classes of barley only to be selected, to the prejudice of the rest; and the others are not used, except from the scarcity of the better qualities.

2607. Is it your opinion that the best classes of barley would be increased in price, if the malt tax were repealed?—I think that all barley would be more in demand over a given number of years, and I think that it would raise the price generally somewhat, because it would increase the demand.

2608. We have had it in evidence that it would increase the price of the best barley by as much as 5 *s.* a quarter; is that your opinion?—My opinion is that the better qualities will always maintain their pre-eminence and a better price.

2609. What special effect do you think that the repeal of the malt tax would have upon the inferior qualities of barley?—It would enable that description of barley to be used for a variety of purposes, and therefore it would give an encouragement to the grower of that barley; he would be sure to find a market for it, and a use for it which he has not now.

2610. Do you think that it would make the inferior class of barley more nearly approach in price to the better class of barley than now?—I do not think that it would alter the relative position; the only thing is that it would give an impetus to one which it has not now; I do not believe that it would lower the price of the best barley in any way.

2611. What I wish to ask is, whether, supposing the malt tax to be repealed, inferior barley would bear a relatively higher price than it does at the present moment with reference to the best barley?—Undoubtedly it would, from the increased demand, and the increased powers of consumption.

2612. Do you find a great difficulty in selling your inferior barley now?—Yes, when we have a bad harvest we find very great difficulty; I am generally obliged to use a great portion of it myself by using it for pigs or other things, for which we can grind it or steep it.

2613. Do you think that the malt tax has the effect of preventing the malsters from buying that inferior class of barley?—Yes, undoubtedly; they dare not touch it unless they want it for brown malt.

2614. Do you think that the malt tax has the effect of preventing the proper quantity of barley from being grown throughout the country?—Yes; I have no doubt that there is less barley grown in England now than there was 20 years ago; there are no statistics to prove that, but I will prove it in this way; from the quantity brought to market and the statistics returned both from Scotland and Ireland during the last decennial period. I will give you, first, the amount returned in the decennial period for Scotland. In 1857, the average of barley and bere (which always accompanies it) is put at 219,995 acres. In 1866 (the last Return you have) barley and bere is returned at 213,619 acres; so that the decrease in Scotland in 10 years has been 6,376 acres. Then, in Ireland (for you have also statistics form Ireland) in 1857 the acreage of barley was 217,314 acres; and in 1866 the returns are 152,777 acres; so that the decrease in Ireland during the last 10 years has been 64,537 acres. Now we have no English statistics, and I cannot give you what I do not possess; but I was going to observe that, according to the return published by the Custom House of imports of foreign barley in the year 1866, the imports of foreign barley to the United Kingdom rose in that year to 2,361,482 quarters; so that there was nearly two millions and a half of barley imported, and with this decrease in Ireland and Scotland (and a certain decrease in England, which, if we could prove it, I feel confident exists), it can be shown that the importation of barley has been increasing, while the growth of barley in the United Kingdom has been decreasing.

2615. You state that you are not able to give the returns for England?—No, you have no Return for England; the one which you are trying to get of last year is very imperfect, and the farmers, I am sorry to say, will not give the return.

2616. Your impression is that the rotation of crops is seriously interfered with by the malt tax?—Undoubtedly; and I would like to observe one thing: there is a reason for growing other corn; in most counties the wheat straw is sold from the land, and the barley straw is not sold. Growers of wheat can sell their straw, and therefore they grow wheat in preference to barley, and the result is that the land is impoverished.

2617. Supposing you grow wheat or oats instead of barley, which ought to be grown in the proper course, that would be very detrimental to the land, would it not?—That would be very detrimental to future crops of wheat; you are exhausting those powers which you ought to increase and preserve for future crops, and the consequence is, that when we have a deficient season, those crops on the description of land which you allude to fail.

2618. Have you any experience of heavy land?—Yes; I have a little heavy land myself.

2619. I suppose that wheat and oats would be more frequently grown upon the heavy land, instead of barley, than upon the light land?—Yes; but I believe a very limited quantity of barley is grown upon the heavy land; they grow more beans, and so on.

2620. But, as a practical farmer, you think that there is no reason why barley should not be grown upon the heavy land?—Certainly not; I say that the change to barley is a relief to that land.

2621. Do you think that upon stiff land you could grow a fair sample of barley; such a sample as maltsters would buy?—Undoubtedly; and taking the chevalier, the new sort that we have, I beg to say that the best qualities have been grown upon heavy land, with judicious cropping. In some seasons, the finest qualities we have are grown upon heavy land.

2622. You think, then, that if the malt tax were repealed, land would be cultivated in its proper course?—I think there would be a greater inducement to cultivate it in its natural way, so as to produce the largest returns, and more barley would be grown undoubtedly.

2623. Do you know anything of the Act that was passed, called Mr. Gladstone's Malt by Weight Bill?—Yes, I have heard of it, and I know maltsters who have been very much benefited by it. I know a maltster who has assured me that it has saved him at the rate of 100 *l.* a year this last year.

2624. You think that that Act has worked well?—Yes. It gave people a little encouragement to malt the inferior barley.

2625. Do you think that that was English barley or foreign that was used in the case that you referred to?—Some of it foreign. I believe that this firm who saved 100 *l.* used as much foreign as English.

2626. So far as you know, that Act has improved the sale of the lighter barleys?—It has given a little impetus to it, but I cannot say that it has done much, it is used to so limited an extent.

2627. Within your own knowledge, has that Act been a benefit to the farmer?—It has given in a trifling degree a better sale to that inferior quality of barley.

2628. Passing now to the other Act, Mr. Gladstone's Malt for Feeding Cattle Act, have you had any experience of that?—I have not used any myself, but I have known and seen farmers who have. The reason I did not try it was simply this: when I wanted to make the experiment of using malt, it was from the too great succulency of green food which caused the ewes to slip their lambs, and to correct that you could not use linseed at all. I was obliged to use other malt, and found great benefit from it.

2629. You yourself have had no benefit from the working of that Act?—I have not; and my experience with regard to others, derived from information, is that it has been of very little benefit to them.

2630. From what you have heard, then, it appears to have failed through the country?—It appears to have given no general satisfaction, and has not been used to any extent.

2631. Have you tried malt alone as food for cattle?—Yes, I have. I made an experiment last year which I thought it was necessary to do, because I have a strong impression upon this point, that the feeding of cattle with malt has never been fairly tried or tested; and I have a strong impression on my mind that those experiments which have been made, have been made with the view of defeating the object.

2632. Do you allude to Mr. Lawes's experiments?—Yes, I do, and to experiments which have been made by the late Sir Robert Peel, copies of which he sent to me himself; and I wrote to him and told him that those experiments were abortive experiments, that they proved nothing, being only designed to defeat the object. Malt must be used, I hold, with very great caution and some judgment in the matter; malt is a tonic, and the most powerful tonic that we have in arresting any disease or flux, or looseness in the bowels, and in correcting the derangement of the system; and for ewes before they lamb there is not anything equal to it; I hold that all the ewes in the kingdom should receive a pint of malt a day for three weeks before they lamb, and you would save a great many lambs that now are lost. I made this expiriment: I took 40 ewes from a flock which I found were fast losing their lambs, and I put those 40 ewes on stubble; I took them quite away from the succulent food, because it is the succulent food that brings the injury, and the malt is the corrective. Having put those 40 ewes upon this stubble, I gave them a pint of malt a day bruised between rollers and mixed with hay-chaff, and I gave them nothing else for three weeks, but I continued the same food; I found that they ate every particle of grain or grass, or anything in the stubble, with avidity after they had had the malt. That shows the advantage of using malt for consuming inferior hay; with malt they will eat anything, all the grass in the stubble. By degrees after a few days these ewes began to lamb; and although of 20 ewes taken out of the flock at the same time as these all lost their lambs, out of these 40 fed with malt 36 lambs were saved, and some are excellent sheep living to this day.

2633. You attribute the saving of your lambs in that instance to the use of malt?—Undoubtedly, because those that had no malt were all lost. I could not have used Mr. Gladstone's mixture with linseed, because linseed would have defeated the object; showing the impracticability of mixing two compounds for general use which are not fitted for it.

2634. Then your impression is, that if you had used Mr. Gladstone's mixture instead of using pure malt, these ewes would have slipped their lambs?—No doubt; it would have defeated the object; linseed would have aggravated the complaint, and they would have cast their lambs prematurely.

2635. So far then as ewes are concerned, you consider malt a most valuable food?—Yes, when used in the proper way, and with discretion.

2636. Do you ever use it for lambs?—Yes, we use it for lambs.

2637. When do you give it to the lambs?—Say at five or six weeks old; they begin then to feed pretty well, and there is nothing equal to malt to prevent scour with lambs.

2638. What quantity do you give the lambs?—A quarter of a pint a day would be a full amount to begin with; they would not eat that all at once; by degrees they would eat a little more, but they never require more than half a pint per day. It would be better for them than too much linseed. I find I have given mine too much linseed oftentimes.

2639. Then you think that, so far as both ewes and lambs are concerned, pure malt is a most valuable food?—Decidedly, and at particular times and seasons invaluable; nothing can equal it.

2640. As regards calves, do you think it also good for calves?—Yes, for young calves to prevent the scour in them, which is the most fatal thing for calves.

2641. You would not feed calves regularly upon malt, but would give it them at certain times?—When they are very young. You must scald it, and give it them as a beverage, as you would milk or gruel, but when they get bigger it ought to be well ground and mixed with chaff.

2642. You have tried it yourself for calves?—Yes.

2643. And have found it answer?—I have found it answer very well; nor do I know any thing which I would use or think of so much benefit for the purpose as malt.

2644. With reference to bullocks, have you tried it with bullocks?—I have tried it on a very small scale with bullocks, and I do not think that it would be so valuable for bullocks in a general way as it would be for these younger stock. I do not think that there is any drawback in using it for bullocks, but there are not the advantages in the one case that there are in the other.

2645. Supposing that the tax was off and it was cheaper, would you then think it an advantage to use it for bullocks?—I feel sure I should use one-third of malt for bullocks and other stock in preference to giving so much oil cake and other things, if the malt tax were off.

2646. Do you consider that malt is preferable to what is called speared barley?—I do, for every purpose of staying the stomach; but I do not think it preferable for putting flesh on horses just for the moment.

2647. Or on bullocks?—Yes, on bullocks I think it is preferable; I have known horses fatted on speared barley.

2648. Have you ever tried speared barley for bullocks?—No; I had not faith enough in it.

2649. Are you aware that the Excise has interfered and prevented its being used?—I am, and I do not use it; I do not like to come under the ban of the Excise law.

2650. It was your opinion, up to that point, that it was allowable?—Yes; I have used speared barley for pigs to advantage; but we are stopped at that now.

2651. Mr. Lawes, as the result of his experiments, gives it as his decided opinion that barley is better than malt for feeding purposes; is that your opinion?—No; I saw his bullocks (and if his bailiff were here he could confirm what I say) after he had been feeding the one portion on barley and the other on malt: they were divided by a temporary division; and the bailiff said to me, "I will not tell you which lot is having malt; you shall judge for yourself." I went in and examined them, and said, "These are the bullocks having malt." They were in the best condition. "You are right," he says. But I understood that afterwards they varied the quantity of malt given to those bullocks. I am quite sure that malt, if used properly, is the best thing of the two to stimulate them, particularly in the early and late stages.

2652. Then it is your decided opinion that malt is an advantageous food, provided there was no duty upon it?—The very best we have for all rearing of young stock, and for feeding cattle, under proper circumstances.

2653. Do you brew for your people for haying and harvest?—I do.

2654. Do you ever give them malt instead of brewing for them?—No, we do not, because they have not been accustomed to use it; they have not been accustomed to brew, not having the machinery.

2655. Then in your part of the country the labourers do not brew?—No; and the majority of the farmers have given up brewing for some time; they have their beer from the brewer, and a very bad effect it has upon the labourers, I am sorry to say.

2656. Why has it a bad effect upon the labourers?—They cannot work upon the brewers' beer; it is a fermented article; it goes to the head, and they tumble off carts and break their arms and limbs, and all sorts of things. I have been the chairman of a board of guardians for 10 years, and every year, as regularly as haytime and harvest came on, we had a specimen of these cripples brought in, and in scarcely an instance where these accidents occurred did the farmer brew his own beer.

2657. Mr. *Dent.*] The farmers did not give them so much, perhaps, of their own beer?—I cannot say what they gave them: I only know the effects.

2658. *Chairman.*] Is it your opinion that if the malt duty were taken off, the farmers would be

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be induced to brew their own beer?—I think that many would return to their old habits.

2659. Do you think that the labourers would brew also?—I think they would in some instances.

2660. You say that you have not the machinery in the cottages; but I suppose that in each of your cottages there is a copper?—Yes, but the women have not been accustomed to it, and they would make excuses. I know two instances, recently, where women have been brewing beer with treacle because they could not buy malt, and such women will brew with the view of keeping their husbands at home.

2661. Then I learn from you that your opinion is that public-house beer is exceedingly bad, and that if the tax were off, people would brew at home, and that would be a very great advantage both to themselves and to their labourers?—Yes, to some extent.

2662. I presume when you spoke of brewers' beer, you meant public-house beer?—Yes; they might get it at the brewery.

2663. Do you know whether that beer is very much adulterated?—Well, we have every reason to believe it; but it is not always easy to see the hand that does it, or to describe the exact process. I think that the state of fermentation which the brewers' beer undergoes just makes it heady. It has to be cleansed in a short time, and then it imparts these fiery qualities to a certain extent. I do not say that that is the only cause.

2664. Do you know whether a great deal of sugar is used instead of malt?—Yes, I know a large brewer in this metropolis, and I was credibly informed the other day by the manager that they are using one-half of sugar as near as could be at this present time.

2665. Do you think that sugar and other substitutes are used on account of the high price of malt?—Undoubtedly, sugar is used for profit, certainly not for advantage, and I do not believe that any other substitutes for malt are used for advantage.

2666. Then your opinion is that if the malt tax were taken off, malt and hops would be used instead of the other substitutes?—Yes, I think that malt would be the cheapest thing to brew from, and then I think that the self-interest of men would prevent this adulteration.

2667. Do you not also think that it would be a great advantage to the farmer in brewing for himself, because he would have the grains and malt dust and other things, which are very useful for the purposes of food?—Undoubtedly; I believe that is one reason of the high price of cattle food, and I think it is a very important item in this matter, that by losing the growth of barley and the quantity of malt which could and would be made, we lose the grains and the dust from that. When you use sugar, there is no grain, because the sugar is dissolved.

2668. Mr. Dent says that the maltster would have the dust, but that is not always the case, is it?—The maltster would have it if he made his malt, but he would have that dust to sell to the farmer. It would be sold to the graziers. He could not use the malt dust and grains himself, and if he did use them, they would come in competition with cattle food, and lower the price of it.

2669. I thought that in olden days the custom was that you sent so much barley, and that you got everything back, paying a certain amount for the malting?—Yes; the increase would pay the cost of making. No doubt, therefore, the dust in their estimation was of some value.

2670. Then your opinion is, that the malt tax has a very bad effect on the public health, so far as the labouring classes are concerned, and that it also is very injurious and detrimental to the agricultural interest?—I believe it to be very injurious in every way, and I believe that the health of the labourers is very much affected. I allude to that portion of them who are accustomed to drink brewers' beer. I say that those men who drink beer at public-houses are in general heavy and stupid; their faculties are numbed; they have no life or spirit in them; and their usual statement of themselves is this, that they feel like dead men; and I say that that is not the case with those who use home-brewed beer. I do not find those men talk of being dead men, but they can live and work with it, and be healthy, and it does them a great deal of good.

2671. Sir *E. M. Buller.*] With reference to this brewers' beer, is that of a bad quality before it goes to the public-house; do you happen to know the quality of the brewers' beer that is furnished in your neighbourhood?—As far as my knowledge goes (and I have a cousin a brewer), I believe that their beer is sent out a very good article from them, but I think that there is a good deal of adulteration that goes on at the public-houses afterwards.

2672. You do not throw any imputation on the brewers?—I do not. Indeed I know just the reverse.

2673. Do you happen to know anything of the comparative strength of the beer which the brewers supply, and the beer which you give to your labourers?—I could not measure it by degree, but I have tested the brewers' beer and porter in some of their London houses, as regards porter sent out from Reid's brewery and Meux's, and the article is very different which is sold retail. In the houses that profess to sell it genuine (there are only a few that do) as it came from the brewer, I see an excellent article, but in the others an adulterated article. I cannot tell you the difference in degree, but it is so different that you would not know one for the other.

2674. Supposing the brewers should say that the reason why these accidents, of which you have spoken, occur, is that they sell the men good strong beer, while you give them a weak beer?—They might say that, but that is not so.

2675. You say that you have been in the habit of brewing for your men?—I always do.

2676. What quantity do you brew for them?—About 9 bushels to 10 bushels to a pipe of ale.

2677. How many gallons is that?—Three barrels, 108 gallons; to that there are from 9 bushels to 10 bushels of malt.

2678. Then there is your small beer?—That is given to the men; it is not taken any account of; still it is a light and wholesome beverage.

2679. How many gallons do you get of that?—The same quantity, I may say; or not quite so much.

2680. Have you ever calculated the cost per gallon?—I have; I cannot give it you critically correct, but the estimate I have would be something like 1 *s.* per gallon at the present time. We use a good many hops.

2681. That is your ale you are now referring to?—Yes; we do not take the other into consideration,

eration, but I think that the ale would cost bout 1 *s.* a gallon.

2682. What is the price of ale at a public-ouse in your neighbourhood? — It is 4 *d.* nd 6 *d.*

2683. Why 4 *d.* and why 6 *d.*?—The sixpenny said to be superior, and it may be some of ass's bitter ale, that is always sold higher, but e common ale is sold at 4 *d.*; I think that Bass's sold at 8 *d.*, by-the-bye.

2684. You are not able to say, from your own xperience, what proportion of the cost of your eer is taxed, and what is the prime cost of the rticle that is consumed?—I think that we could rew at something like one-half, if we could get id of the malt duty.

2685. You have not gone minutely into that uestion?—I do not profess to give you that cri-ically, because it is rather more a question for rewers, which I do not take up.

2686. You stated that one of your neighbours, maltster, has saved 100 *l.* per annum in conse-uence of Mr. Gladstone's Malt by Weight Bill; ould you explain how so large a sum as that ould be saved?—He is a brewer and uses some uantity, and makes his own malt, and he must nake a sufficient quantity of malt for the reduc-ion of the duty to give him that amount of ad-antage.

2687. Practically, how is the duty levied?—t is levied by weight there.

2688. How is it taken by weight; under or-linary circumstances the duty is levied on the nalt or the flour, is it not?—I think they weigh he barley before it is put in the cistern; I have lways understood that that is so; the reduction f the duty is only upon barley below 51 lbs., nd I merely say, that whatever the weight is, t is taken before it is put in the cistern; you annot tell anything about the weight of barley fter it is put in the cistern.

2689. What would be the difference in respect f duty between a bushel of heavy malt and a ushel of light malt?—The difference is now 2 *s.* er quarter; ale brewers tell me that there is a onsiderably greater quantity of extract in the arley weighing 56 lbs. or 59 lbs. a bushel.

2690. What is the difference in the duty?—About 2 *s.* a quarter.

2691. Then in order to make 100 *l.* differ-ence, a thousand quarters of malt must have been used?—Yes; we have men in our district who nake 30,000 to 40,000 quarters of malt; not all f that sort.

2692. Lord *Eustace Cecil.*] Is the beer, in your opinion, which is made of sugar alone deleterious?—I have tried it made with sugar, and my impression is, from the trial I have made, and the experience I have had, that it is not an article nearly so wholesome as the beer made from malt, and it will not keep so well; it turns acid in a very short time.

2693. Have you ever observed that it has a peculiar effect upon your labourers; you have stated that your labourers often fall from waggons, and so forth; would that be from drinking sugared beer or adulterated beer?—I cannot state that; but I believe, undoubtedly, that the sugared beer is not a wholesome thing, and it would not keep at all.

2694. Have you ever carefully examined the beer sold in public-houses in your neighbourhood?—Yes, I have, and I know most of the brewers.

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2695. And do you find that it is adulterated, or that it is simply made with sugar?—It is an article made for selling quickly; that is the fact.

2696. Have you ever found that salt has been put in it?—Yes, a good deal of salt; perhaps a little salt would not be injurious, but a quantity of it is bad.

2697. You look upon that as an adulteration, then?—Yes.

2698. What other drugs have you found in that beer?—I could not tell you myself; but there are many men in London who could. Undoubtedly they have a method of making beer from drugs only.

2699. The reason I ask these questions is to find out whether the beer sold is made from sugar only, or whether it is an adulterated article?—There are very few, I think, who make it from sugar only; they are obliged to use a certain amount of malt to make it palatable.

2700. Have you ever turned your attention to any substitute for the malt tax, supposing it were abolished?—Yes; and my conclusion is this, that it would be far better for the public, and for the community at large, that there should be a tax upon beer so long as it is absolutely necessary, and that the raw material from which beer ought to be made should be left free. I believe that if the raw material of cotton or wool were not free, it would be a great impediment to the manufacture of good articles in those departments; and it is just the same with malt. If malt were free, it would be in the estimation of all brewers I have ever talked with, and whose judgment I have relied on, the cheapest article, and there would be less inducement to adulteration; and I think that, under those circumstances, we should in a few years make double the quantity of malt in England that we have made of late years.

2701. Do not you think that if a great deal of private brewing went on, that the visits of the exciseman would be very disagreeable, supposing a beer tax were substituted for the malt tax?—I suppose that excisemen would have some duties to perform, but not more disagreeable than they have now, or had before 1829, for you are aware that there was a beer tax before 1829.

2702. You, personally, have no objection?—I have no objection to that, because excise duties must be levied so long as they are the law of the land; and of course they would be levied in the least offensive way. Nothing can be more offensive than the way in which the duties are levied from maltsters in the neighbourhood of Ware, where I reside, the greatest malting town in England; we have had repeated charges of fraud by the Excise against the maltsters. One gentleman was very heavily fined, but he left the neighbourhood because it would have ruined him if he had paid it.

2703. In every point of view, you think the beer tax preferable?—Yes, I think it most unjust to the agricultural interest to prevent the growth and consumption of barley in this kingdom, and that that being the second staple article in all agricultural produce, should be subjected to a tax equal to that levied on articles from tropical climes. Two cwt. of sugar is equal, the brewers tell us, to a quarter of malt. A brewer has informed me that one cwt. of sugar (Madras or West India sugar) at a price of 30 *s.* per cwt., will give an extract of 48 lbs. of gravity; that is

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96 lbs. of gravity for two cwt.; while one quarter of malt of the growth of 1866, (which is very fine malt, and which costs 73 *s.*, or, adding the 1 *s.* duty on the brewing, 74 *s.*) will give 93 lbs. of gravity; so that you see their estimation is, that two cwt. of sugar comes in competition with one quarter of malt, and the duties they pay are these: two cwt. of sugar at 30 *s.* a cwt., pays 8 *s.* a cwt. Customs duty, that is 16 *s.*; then the Excise duty for brewing that is 3 *s.* 8 *d.* per cwt., that is 7 *s.* 4 *d.*; that makes 1 *l.* 3 *s.* 4 *d.* duty on that article, and on malt it is 1 *l.* 2 *s.* 8 *d.*; so that you see that the English farmer is actually paying on the second staple article of his produce, an amount of duty equal to that levied upon the products of a tropical clime under an unrestricted competition of free trade with the whole world. Now, I protest against this as a monstrous injustice, and I say that no statesman whoever assisted in carrying out the free-trade system ever contemplated such a state of things, nor can he defend such a state of things. I moved one of the first free-trade resolutions that any farmer in England ever carried, but when I did that, I pointed out the evils of the malt tax at the same time.

2704. Colonel *Duncombe.*] I believe, in your neighbourhood, malting is carried on to a very large extent?—It is in the neighbourhood of Ware; that is the largest malting town in England.

2705. You have mixed a good deal with maltsters, I dare say?—I have known them all my life.

2706. Can you tell the Committee the opinion of the maltsters with regard to the abolition of the malt tax?—Many of the maltsters make by commission at so much per quarter; those are the large men, and they are careless about the thing, because they make their profits certain; but the men who have to come into the open market and risk their capital, are ruined almost to a man.

2707. Mr. *Dent.*] Do you say that maltsters are generally ruined?—I am speaking of the neighbourhood of Ware, where I live. I hope that you are more fortunate in your experience; but you must bear in mind the different classes of maltsters that I allude to.

2708. Colonel *Duncombe.*] The opinion of that class to which you now refer, is against the malt tax?—Yes; and there is a growing impression, even upon the minds of the commission men, that this state of things cannot be maintained much longer.

2709. In regard to that establishment in London, in which you said that the manager informed you that half sugar and half malt were used in brewing, have you any objection to state where that was; I will not press the question if you have any objection?—I should have a little objection on personal grounds, but none on private grounds; I may say, that I believe sugar is used in a very general way by all London brewers.

2710. Major *Parker.*] You alluded to the quantity of stock that you had for the last 20 years annually fed on your farm; would you enumerate what description of stock they are?—Yes, they are principally fatting lambs, and sheep, and pigs, not a great number of bullocks; we have no grass; we are upon the four-course system, what is called the "Norfolk system;" and every year we have been in the habit of fatting a great many lambs; and being dry land, with plenty of turnips, we want this malt and other things to feed our stock; they are principally 500 or 600 lambs a-year, and 300 sheep, and perhaps 150 pigs, sometimes 200, a few bullocks, and not a great many calves, for you cannot keep cattle without grass; we use artificial food; but that is a system of high farming, as you are aware, and throws down the barley, and makes that barley of an inferior kind.

2711. To what do you attribute the falling-off of the growth of barley in Ireland and Scotland?—To the growth of wheat with a view of selling the straw, and making a greater return. I believe that a very large proportion of the land in Hertfordshire, in the district in which I reside, is farmed from hand to mouth, so that a man may get away at a moment's notice.

2712. But in the earlier part of your evidence you alluded to the falling-off of the supply of barley in Scotland and Ireland?—Yes.

2713. It was with reference to that statement which you then made that I asked the question, to what do you attribute that?—The Scottish farmers tell me that they find wheat and oats answer their purpose better in wet harvests; if they get their barley damaged in wet weather, it is very difficult to find a market for it; and we have had wet harvests, three or four years ago. In Ireland I attribute it to the poverty of the farmers, and to the difficulty which they have in selling their inferior barley too. I think that the agriculture of Ireland is in the lowest possible state; it is going back to a state of nature in many instances.

2714. *Chairman.*] Do you know anything about Ireland?—Yes, I am chairman of a railway company there. I have been through it and over it. I have been there in harvest times, and I am sorry to say that I have many thousands invested there, which, if the land were farmed, would be worth double to me what it is now.

2715. Mr. *Henry Surtees.*] Have you used malt dust for feeding purposes?—Yes, we generally use a certain quantity when we can get it.

2716. And grains?—Yes, they are very valuable for milking cows.

2717. Do you think that if the malt tax were repealed more malt would be made, and that consequently there would be more malt dust and grains for feeding purposes?—Yes.

2718. And that would be a benefit to the producer and to the public?—Yes, from every hundred quarters of malt the quantity of dust would be 5 per cent., and if we malted a very considerable increase, say one-half more than we do, we should have 5 per cent. of dust from that; and we should have nine bushels of grains for every quarter of malt as a fair calculation, in excess of the present supply; and that would have a very material influence in supplying food for cattle, in which we are now very deficient, and for which we are paying the prices of human food.

2719. You mentioned that you considered that you brewed at the cost of about 1 *s.* the gallon; did that cost of brewing include the cost of the small beer?—Yes, for that we do not take into account.

2720. You meant that you got the gallon of beer, and the small beer too, for the 1 *s.*?—That is about it.

2721. If a beer duty was substituted for the malt tax, how would you propose to impose that beer r duty, or to collect it?—I do not think that Government in this country has ever at- pted or dare attempt to put the exciseman private houses. I speak of public brewers. not for a moment advocate such a thing, nor uld I ever advocate such a thing, as that every glishman's house is to be liable to the espion- of the excise. I merely allude to the duty t was levied on beer in 1829. I think that on lic brewers the tax might be collected with as h ease as it was in 1829.

722. You do not recommend the duty to be posed on private brewers?—Certainly not; re is no duty on private wines; I mean on tish wines; and therefore the system may be ly carried out; it is no more difficult in one than in the other.

723. Mr. *Read.*] Do you think that the de- ase of the growth of barley in Ireland and tland is attributable to the malt tax?—I think the difficulty of finding a sale for their rior barley in Scotland and Ireland has been reason for inducing them to grow less.

724. Do you think that more grass is grown consequence of the decrease of barley?—I re you that there is not more grass grown in and, and they grow but a limited portion of at and seeds in other parts; I do not think there is any substitute for the barley that is grown.

725. Is it your opinion that less barley is wn in England than there was?—Yes, I eve that there is less barley grown in gland (only, as I have said, I could not prove luring the last 20 years, and I will tell you ; I know many instances where farmers who e in the habit of growing barley 20 years ago, e taken to growing wheat or oats, or some- g instead of barley; and I know that the culty of selling the inferior barleys at our kets has been so great that they have found er articles more profitable.

726. You would think the climate of England cially adapted for the growth of barley?— ; I have been over different parts of the ld; I have been in Prussia, Holland, and er countries, and I believe that we could pete successfully with all the world. One of largest brewers in Amsterdam came over to gland and assured us that he would buy the le of his malt here if the export were free, the trade was so beset with penalties that it ld be a loss to him to do so; that was the ression of an Amsterdam brewer.

727. You are aware that the Malt by Weight l was passed specially to benefit the growth of ley on heavy land?—Yes.

728. And you are also aware that the barley wn on heavy land is generally coarse and vy?—As a rule, it is coarse, but there are eptions.

729. Did you ever try steeping malt as a food cattle, and then throwing that steeped malt r some cut hay?—I have not used it in that y; the only way in which I have used malt for eping would be to give it to horses after ex- stion, after hunting, and so forth. I have no bt that it would answer very well either way, I have not tried it in the way to which you de.

730. Do you think that the malt mixture ich is made under Mr. Gladstone's Act is too ely ground for stock generally?—Yes, I con- er it so, and I do not like the mixture of the linseed with it, because you are compelled to use the linseed whether you want it or not. I think that that is a very great drawback.

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2731. You saw the cattle that were fed by Mr. Lawes on malt in the early stages of the experiment, and I think you said you considered that those cattle which were fed on malt, were better than the others?—Yes; I saw them in an early stage in the experiment, and I had no difficulty in selecting those fed upon malt, but I did not see them when they went away at last, certainly, but had they continued the experiment in the same way, I believe that malt would have won the day. They altered it in some way afterwards.

2732. Have you any idea what quantity of malt they gave in those experiments?—I only know from the statement of the bailiff, and from memory I think it was about half a peck a head per day, but they altered that very much, and I think to too great an extent.

2733. You would imagine that if these cattle were surpassed afterwards by those fed on barley, in all probability these cattle were surfeited by too much malt?—Yes.

2734. You are well aware of the uniform restrictions that are imposed on all maltsters in the manufacture of malt?—Yes, I am quite aware of many restrictions, for I have seen them put in force.

2735. Do you think that those uniform restrictions are detrimental to the manufacture of malt?—Certainly they are.

2736. And do you think that if maltsters could malt as they pleased, they would malt all sorts of barley in all seasons of the year, in exactly the same way?—Certainly not; it would be a great advantage to them to exercise their judgment in the matter according to the quality and condition of the barley.

2737. Mr. *More.*] Do you think that malt would be generally used for feeding purposes, amongst all classes of farmers, if the malt tax were repealed?—Amongst all stock farmers; it is used by some, and I want to increase that number.

2738. It is not generally used by them now?—No, it is not.

2739. Is that because they are not aware of its feeding qualities, or because of the operation of the malt tax?—It is simply because the majority of them keep so little stock, that they buy no food at all; they would as soon think of feeding with gold as with malt.

2740. Do you consider that the adulteration of beer is owing to the malt tax?—Principally; I think there would be less inducement to adulterate beer if the malt tax were off.

2741. You think that the repeal of the malt tax would materially diminish adulteration?—Yes.

2742. Why?—Because malt would be the cheapest article to brew from; men do not adulterate from choice, but from interest.

2743. You think that malt, then, would be cheaper than any adulterating material?—Yes; for making beer all brewers tell me on the average, and on the average of years, it is the cheapest article.

2744. Mr. *Arthur Peel.*] Are you prepared to say on your own responsibility, as a farmer, that the main reason why less barley is grown in England now than was grown 20 years ago is the malt tax?—Yes, I do say so.

2745. You do not think that there are other reasons?—

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reasons?—There may be other reasons, but that is the main reason.

2746. The imports of foreign barley have been increasing of late, have they not?—They have.

2747. What quality are those imports?—A good deal of that barley is very inferior, and fit only for grinding.

2748. You do not think that foreign barley would ever compete with our best barley, if the malt tax were taken off?—I have no fear of that.

2749. Do not you think that foreign barley might compete with the second quality of our barley?—I have no fear of any competition; the general growth of barley on the Continent is of too quick a nature, it grows too rapidly, and you never get a large kernel in a rapid growth of any kind.

2750. I thought evenness of weather was the great point?—You want climate of a certain kind also, to make it solid.

2751. You were speaking of the mixture of linseed with the malt, and you said that you found the linseed prejudicial to the cattle?—It would be for the purpose mentioned.

2752. Can you conceive of no other mixture which might serve the purposes, and be desirable in the interest of the Excise?—I have nothing to recommend on that head.

2753. Do not you think that it is better for the convenience of the public, with reference to the Excise interference, that the Excise interference should be limited to a few public maltsters, than that every private brewer should be exposed to it?—I consider that you cannot introduce anything which would be a greater annoyance than the present system.

2754. Would you multiply that inconvenience?—I do not want to multiply it; I want to get rid of it.

2755. I mean, supposing that you had a tax on beer, instead of on malt, would not the inconvenience of the Excise be multiplied so far?—I do not believe it would. I knew brewers that were subject to it in 1829, and I do not recollect that there were any more difficulties about getting the tax on beer, that is, the Excise duty on beer, than there were in getting the Excise duty on malt. I dare say they would rather it should not be on at all, and I do not wonder at that.

2756. Mr. *Dent.*] Are we to understand that you propose some substitute for the six millions and a half of money now raised from the malt tax?—I do not propose anything; I should rather that you would economise in the House of Commons to save the whole amount; that is what I prefer.

2757. But it is not likely that we shall; at present the malt tax raises nearly six millions and a half net revenue; how do you propose to replace that revenue if you do away with the malt tax?—Well, economy is the best means of replacing it. I do not suppose that it could be wholly got rid of at once, and so would say put a tax on beer of a limited amount till you can get rid of it altogether.

2758. Will you tell us how you would apply that tax?—I would have it done in the same way as in 1829, when there were two descriptions of beer, and you might levy a certain tax on each of the two qualities.

2759. But I understood you, in answer to a question given some little time ago, to say that you would only levy a tax on the public brewer?—I would never send the excisemen to private houses.

2760. Do you pay your men their wages in beer?—No; we always pay them in hard cash, but they always expect beer, and have it.

2761. But beer, if they expect it, is part of their wages; if you did not give them beer, you would give them money, I presume?—They would be paid more, certainly.

2762. According to you, the public brewer is to be taxed, and the private brewer is not; and the farmer pays a certain proportion of his wages in beer?—Some may, but I do not say that they all pay in beer, although that is the tendency.

2763. We have had evidence here that in the eastern counties a large proportion of the wages is paid in beer, as much as 1 *s.* a week, at least?—Yes; I know it is so.

2764. Therefore that would be giving the farmer an advantage in the payment of his wages as against the public brewer?—You say "an advantage;" but the brewer always has an advantage over the farmer in brewing, because he brews a large quantity, and the farmer a small one.

2765. But surely a large farmer, farming his 1,000 acres, and employing perhaps 40 labourers, and giving these men beer every week, and an extra quantity at harvest and haytime, must brew on a large scale?—Yes, he must to some extent.

2766. We have had a witness here who said that the abolition of the malt tax would make a difference of 50 *l.* a year to him at least in the beer he gave to his labourers?—Yes, that is quite possible.

2767. If you put a tax upon the public brewer, and do not put it on the private brewer, it must be a protection to the farmer in the way o wages?—Well, he would have no additiona advantage beyond that position between the far mer and the brewer. When there was a tax o beer, they both paid a duty on malt, and if ther is no duty on the malt now, neither will pay it the advantage of the brewer in brewing on large scale would amply repay any advantage o the other side.

2768. You are going to replace this six and half millions by a tax upon the public brewe only?—Do you calculate that there is to be n reduction? is it all to be made up by an extr tax?

2769. You must put economy out of the que tion for the present; I ask you how do yo replace the six and a half millions?—I am n Chancellor of the Exchequer; but if I were, would see whether I could not economise as we as put a little extra duty on the brewers, whi they can well afford to bear.

2770. The fact is, you wish to have a prote tion to the farmer in the payment of his wage as against the public brewer?—I want to gi the farmer freedom for his industry, which eve class, except the farmer, possesses, and I say th he is entitled to it under the unrestricted fre dom of trade.

2771. You say that many maltsters are ruin by the duty?—I say that in a large town, whe more malt has been made in the last 100 yea than in any other town in the kingdom, that p tion of the maltsters who have been living on th own capital in the open market, have been inv riably ruined, and those only who have made on commission, have succeeded.

2772. That does not quite accord with the ve

lar

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ge malting establishments which we see as
pass along the railroad in every direction.
ce such towns as Grantham and Newark,
ich I pass continually; there are immense
ting establishments growing up every year
re?—We admit that, but they may be made
the use of brewers under commission, and I tell
that they are thriving. The brewers thrive
y well, but it is the independent maltster who
to take his malt to market, and give four
nths credit for it, and at the same time to pay
heavy duty, with very short credit, who does
thrive.

773. You say that there is less barley grown
England; than there was 20 years ago?—That
ny firm opinion, and it will be proved some
.

774. Can you give us any fact on which you
und that opinion?—The introduction of nearly
ee millions of foreign barley, without any
siderable increase of malt made; you have
increased the quantity of malt more than a
lion in the last 10 years.

775. But is not barley used for other purposes
ides malt?—But look at the price it has got to,
cannot use barley at the present time for
ding purposes to any advantage.

776. You must be aware that the barley har-
t last year was a notoriously bad harvest?—
was one of the best crops we have had in our
rict.

777. But in other districts it was one of the
rst?—It has never been invariably good all
r the country.

778. Have not barley farms been more sought
r by farmers than any farms recently; have
y not let at higher comparative rents?—I do
quite understand your question.

779. You understand on what lands barley is
st easily grown, and where you get the best
nple?—Yes.

780. And have not those farms (I will take the
ts of the country which I am best acquainted
h, such as the wolds in Yorkshire and Lin-
nshire, and those farms are especially barley
ms) been at a premium in the market lately?
With those who grow the best qualities, I
pose that may be so. They believe that
y have an advantage under the duty, because
y grow a superior quality, and I say that it is
ery narrow policy that guides their conclusion,
cause they will always have a market for
best article at a comparatively enhanced
ce.

2781. Do not you think that the barley has been
best crop the farmer has grown for the last
years?—Occasionally, but not generally.

2782. It bears a higher proportion of value
n either wheat or oats, does it not?—You are
getting one thing of the barley crop; it is a
ry delicate crop, and more liable to injury from
season than anything else.

2783. That is why I said that it was an ex-
ptionally bad harvest this last year?—But
nerally speaking I considered that last year's
p was a good average.

2784. You told us that farmers now had their
er from the brewers in your neighbourhood,
at they bought their beer, in fact?—Yes; and
me of the labourers have never paid for theirs.

2785. What is the reason they have taken to
ying their beer from the brewers so much?—
he fact is, that they get the beer from the brewer
thout any delay, and it may be done when they are giving beer to the labourers for the harvest.

2786. You stated that the labourers did not brew, and that the farmer did not brew, but that they bought their beer from the brewer; I ask you how it is that they buy that beer from the brewer instead of brewing at home?—The reason is, that from the high price of malt, and the inconvenience of brewing at home, they give it up altogether.

2787. I do not know why the high price of malt should prevent their brewing at home if they could brew it as good, or as cheaply, as the brewer?—You may not know that, but you may recollect this, that a person who has to go and buy malt at a particular time of the year in a small quantity, would have to give an additional price; and there is not any article that varies so much in price, between the wholesale consumer and the retail consumer, as malt does; with the duty upon it there is as much as 1*s.* to 1*s.* 6*d.* a bushel difference at different times.

2788. Is it not the fact that the brewer, from his large establishment, and his superior means of working, can brew a very much better article, at a much cheaper rate, than any private person?—His great advantage is his machinery and his power, which you cannot deprive him of.

2789. You informed us that the brewers' beer caused a great many accidents, tumbling off carts, and so on; do not you think that the same thing would happen from men taking too much of a private brewer's beer?—The effect is not so great the next day, that is the main difference with the farmer's beer.

2790. I suppose when farmers brew their own beer it is such poor weak stuff that it never gets into the men's heads?—The labourers always want something they can feel in their stomachs, they say, and they prefer the home-brewed beer ten to one. I can find you a publican within a mile of my house who tells me that he never drinks any of his own beer, but if he comes to my house, he begs for some of mine.

2791. You talk of brewers using one half sugar; do you know that until the present year the consumption of sugar has not varied so very materially, and that when it has risen it has generally risen in accordance with the price of barley?—I said that they used sugar for profit.

2792. Are you aware that the brewer does not use sugar until barley is at such a price that it is more profitable to use sugar than it is to use malt?—I believe that if the brewer consulted his own interest he would be glad to have a larger supply of malt, and the only way to have that is to take off the duty.

2793. The inducement to use sugar is strongest when malt has become exceedingly high?—Yes; people do not use sugar from choice. I am quite satisfied that it is for profit, and I want to relieve them of any necessity for using it.

2794. You have informed us that you know a brewer in London who, I think, you say uses one half sugar?—Nearly one half, I say. That was the phrase used by his manager.

2795. May I ask you what brewing firm that is?—I do not think that I am justified in answering the question, but I will give the chairman, in private, the brewer's name before I leave this room. I told you that I received the information through his manager, and therefore that is a confidential communication, and I do not like to betray any man's confidence.

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2796. Your statement is that you have reason to know that one brewer in London is now brewing half his beer with sugar?—I said, nearly one half.

2797. This Committee, of course, wishing for accurate information on the point, would like to know who the brewer is; but if you object to the question, I will not press it?—I think the majority of brewers in London are using a considerable quantity of sugar.

2798. With respect to Mr. Lawes' experiment, I understood you to state that he varied the quantity of malt given to the animals, and that that was the reason why the animals went off?—Yes.

2799. But Mr. Lawes' report does not state an increase; he says, that the quantity of malt given per head to the fat oxen daily, was that which would be produced from 4 lbs. of barley?—Four pounds would not be enough to exercise any influence one way or the other. If I were at home, I could give you the quantities from my own statistics, which I used for feeding cows at the time Sir Robert Peel's Government took up the question.

2800. You said something about the prosecutions of the maltsters, that a number of prosecutions arose amongst them, and that it would not be much more inconvenient to have an Excise duty on beer; but are you aware that there have only been about 186 prosecutions in the ten years ending in 1867?—The fines are not always levied; you do not know how many have been avoided, or how many have been compromised.

2801. *Chairman.*] Have you ever had your attention drawn to the number of licenses issued to maltsters?—I have.

2802. Do you know that in the year 1832, the licenses were 12,824, whereas in the year 1866, the licenses were only 5,821; if you are aware of that fact, I conclude it was to that you alluded when you said that the small maltsters were ruined?—Undoubtedly there was that diminished number of maltsters.

2803. With regard to Ireland, your evidence is so exceedingly strong that I should wish, if you have any reason to modify it, that you should have an opportunity of doing so; how many yea have you known Ireland?—About 15 years.

2804. What parts of Ireland?—The princip parts that I have traversed, have been in th Belfast and Ulster districts.

2805. Is it your opinion that that part of Ir land has improved, or that it has not?—I ma say that there are in some instances very gre improvements, but they are limited, and th larger portion of the land shows symptoms decay; there are certain lands which have falle into the hands of gentlemen or proprietors, better tenants, and they are improved.

2806. Mr. *Ayrton.*] Is there a great decrea in the number of small farmers?—Yes.

2807. A disposition to make large farms? Well, some of the farms that have been occupie by Scotchmen or Englishmen combine certai small farms, formerly occupied by a certain num ber of Irishmen.

2808. And large farmers make large maltsters —They are not large farmers generally in Ir land; I do not look upon them as such; when have seen English farms in Norfolk, Suffolk, an Lincolnshire, I do not think Irish farms ver large.

2809. Is there in England a disposition increase the size of the farms?—In some instance there is, no doubt, but the majority of the agr cultural tenants are very careless now, owing the fact that the labourers are getting the uppe hand, so that they are not satisfied with anythin they give them, they get all they can.

2810. There is no reason, is there, why the should not get all they can?—Certainly not; bu it should be got in a fair way.

2811. Farmers get all they can, and lan owners get all they can?—No doubt; but tha should be gotten in a fair way too.

2812. Mr. *Read.*] Are these large farms Ireland better cultivated than the smaller ones —Very much; I have never seen a large far unless it has been adopted by some improvin person, a landowner or tenant introduced fro Scotland or somewhere else; but the generalit of the Irish farms seem to me small ones, an what I see certainly makes me feel a discourag ment and misgiving as to the land in Ireland.

Mr. Henry Smith, called in; and Examined.

Mr. *H. Smith.*

2813. *Chairman.*] I think you live at Sutton Maddock, near Shiffnal, in Shropshire?—I do.

2814. Have you any other occupation than that of farming?—No.

2815. How many acres of land do you farm?—About 300.

2816. Is yours a barley farm?—A portion of it is very good barley land; about 100 acres are loam, and not so well adapted for growing barley as for growing roots and wheat.

2817. How much grass have you out of the 300 acres?—Only 16 acres.

2818. Do you keep much stock?—No cattle stock at all in the summer in consequence of having so little grass. I breed Shropshire sheep; I am a ram breeder; I keep about 130 ewes, and they bring me from 180 to 190 lambs annually.

2819. Part of your farm you consider to be a good barley farm?—A very good barley farm.

2820. Do you farm on the four-course system?—I do not; I used to, but I have thrown it lately out of course.

2821. Do you farm upon the six-course sy tem?—I could hardly reduce it to a course no I find some benefit from throwing the land o occasionally, in consequence of the nature of th soil.

2822. What crop is it that you are dispensi with?—The barley crop; I used to grow abo 66 acres; I now grow from 30 to 35 acr only.

2823. Is that because you farm very high, an the barley gets down?—Partly so.

2824. And in that way it is discoloured?— is discoloured.

2825. And there is not so ready a sale for then?—No; not by 1 *s.* a bushel.

2826. Do you think that substituting sprin wheat instead of barley is injurious to your lan —I can hardly say it is injurious to the land, b cause I take good care, by artificial means, th it should not deteriorate, by putting on a sprin dressing, or something of that kind.

2827. But in the ordinary course you wou gro grow barley?—I should grow barley in preference.

2828. And it would take less out of the land?—It would take less out of the land.

2829. Why do you substitute wheat for barley?—Because of the difficulty I have in selling the inferior classes of barley.

2830. Do you attribute that to the malt tax and to the maltster, in consequence of that tax, buying only the best classes of barley?—Decidedly.

2831. Supposing that the malt tax were taken off, should you, in the ordinary course, return to the four-course system?—I should not return rigidly to the four-course system certainly, but I should grow more barley.

2832. Is it on account of your heavy land that you do not grow more barley?—More on account of the way I have worked my land for the sheep; I keep about 15 acres down two years now, in clover root.

2833. If I understand you rightly, it is from the precarious crop of barley, if I may so call it; you grow spring wheat or oats instead of barley?—I never grow oats; it is spring wheat.

2834. White wheat?—White wheat; I never grow red.

2835. You think that if the malt tax were taken off, you would then grow a larger proportion of barley?—Certainly I should.

2836. And you think that if the malt tax were taken off, you would have a much readier sale for your inferior classes of barley than you have at this present moment?—Yes.

2837. What effect do you think the malt tax has upon the best qualities of barley as to price?—It certainly does not press so heavily upon the best qualities of barley as upon the inferior ones.

2838. We have had it in evidence, that it makes as much as 5 *s.* a quarter difference to the best class of barley; is that your opinion?—I should say quite 8 *s.* That (*exhibiting a sample of barley*) is grown side by side after turnips, and that (*exhibiting another sample*) is grown side by side in a similar field, after wheat; I should think that there is quite a 1 *s.* a bushel difference in these.

2839. Mr. *Dent.*] How many quarters an acre did you grow of that?—I should say, perhaps half-a-quarter an acre more after the turnips than after the wheat, not more.

2840. Mr. *Read.*] Are they both on light land?—Light land; the best land.

2841. What barley is this?—Chevalier.

2842. *Chairman.*] Would you give us an idea of what your rotation of crops is?—They are on this piece of paper (*handing a memorandum to the Chairman*), but I have not yet had time to finish that statement.

2843. How long have you farmed this farm?—Since 1851.

2844. Would you kindly give us a return of your courses in 1851, and in 1866 and 1867?—Up to the year 1861 I farmed rigidly on the four-course system; that is to say, as nearly as possible as the size of the field would allow.

2845. Perhaps you will give us a return of the kind I have indicated, and showing how you have farmed for the last six or seven years?—I have made very little difference except in growing about one field of beans, from 15 to 20 acres, and leaving one field about the same size down in clover-root two years, and substituting spring wheat for barley on 30 acres after turnips.

2846. What price did you get for that best barley of which you have shown us a sample?—About 50 *s.*

2847. And what price did you get for the second-class barley?—The second-class barley I have in the bags in the barn now; it has not been thrashed long, and is not disposed of; it would not fetch quite the same now, but if I had taken the lot to market then I should have put it at 8 *s.* less than the best.

2848. Would both those samples have been malted?—Decidedly.

2849. If the malt tax were off, what would then be the relative value of those two samples; what price should you expect to get if you took them to market?—I have no doubt that the repeal of the tax would enhance the price of the inferior barley, because I know a neighbour of mine who was offered but 4 *s.* 8 *d.* a bushel for some barley in the earlier part of the season, and he kept it, and has since been offered 6 *s.* for it, because all the good barley is gone.

2850. That does not answer my question; I want to know, supposing the duty were taken off, what you think would be the relative value of those two barleys; there is 8 *s.* a quarter difference now, you say; I should like to know what you think would be the difference between the two then?—The bitter beer brewers are such good friends to us that they are sure to give the price for that better barley; but I think that if the tax were repealed it would have a tendency to raise the price of that brown barley perhaps more than it would the best.

2851. Do you think then that the malt tax prevents the maltsters from buying any except the best qualities of barley?—Certainly, especially at the commencement of the season.

2852. You grew another quality of barley worse than that brown barley which you have shown us, I suppose?—I did not; I was very fortunate; I had but a small quantity; it was ripe early, and I harvested it without any disaster.

2853. But supposing that you had happened to grow a worse sample than that second sample of barley, that would only have come in for grinding purposes?—For grinding purposes, and I should think it would have been another 10 *s.* below that brown sample.

2854. But supposing the malt tax were taken off, would that third class of barley, if I may call it so, be malted, do you suppose?—I think it would, for we often use it for seed.

2855. Have you used malt for feeding purposes at all?—I have.

2856. Have you used it for cattle?—Never.

2857. Have you used it for calves?—Never; I have no cow stock on my farm.

2858. Have you used it for ewes before lambing?—Yes.

2859. How much did you give each ewe?—I simply used it as an adjunct; I never gave it to my general stock if they had stamina to go through lambing without it

2860. How much did you give them when you used it?—Not more than a quarter of a pint a day.

2861. Did you hear Mr. Lattimore's evidence, in which he stated that he gave his ewes one pint of malt a day for three weeks or a month before lambing, and that all those ewes that had the malt did not slip their lambs, or very few of them, but that a great many of those that had not malt did slip their lambs?—I can quite believe and concur in every word of that; but I think that

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that a pint was rather a large quantity to give, because of the high price of malt

2862. And he stated that he gave his lambs, when a few weeks old, a quarter of a pint; is that your custom ?—I never give my lambs malt till we wean them; the stomach of a lamb is very peculiarly constituted; as long as lambs are having the mother's milk they make little use of the first, second, and third stomachs, but the food passes generally into the fourth, and goes into the blood; but as soon as the mothers are taken away (which you know is done very suddenly), the lambs are left to shift for themselves, and in a few days you often see them scour, and go wrong; we lose many of them; and I have always found that a little malt just before they were weaned, and steadily persevered in for a few months afterwards, had a wonderful effect in keeping them healthy, and saving the lives of many.

2863. At what age do you give it to your lambs ?—They are born in March, and I always wean them early in June; my ram lambs are having now nearly a peck of malt among 80 of them; I was away at Bury from Thursday week to last Saturday; I had about 80 ram lambs in a field in one part, and about 90 ewe lambs in another; the ram lambs had been fed with malt, not the ewe lambs; on Saturday afternoon I was obliged to remove several of my ewe lambs which were in a very debilitated state.

2864. Is it your opinion that, if the malt tax were taken off, you as a practical farmer would use a large quantity of malt for your stock ?—I would never be without it.

2865. You think it most valuable for feeding purposes ?—Decidedly.

2866. You have had no experience with regard to cattle ?—No; I buy some Hereford bullocks about October just to convert a quantity of straw into manure. I give them oil cake, but I have never given them any malt; it is too expensive.

2867. If the duty were off malt should you use barley for them ?—An inferior class of barley I should malt for them.

2868. Would you malt it, or simply spear it ?—I should like to malt it; I had the privilege of attending Professor Way's lecture at the college of Cirencester and he told me (and it is backed by Liebig) that the diastase contained in 1 lb. of malted barley has the power of turning 5 lbs. of starch into sugar, at a temperature of 158 degrees; now, granting the heat of the stomach of a sheep to be at 100 degrees, I believe that a little malt mixed with other corn compounds containing starch, would not only be valuable for what it contains itself, but for the presence of that diastase in it, which would convert a large quantity of the starch in the grain which we give them into sugar.

2869. We have had it in evidence that a large quantity of speared barley might be given with great advantage to cattle, but not such large quantities of malt. You have had no practical experience in that, perhaps ?—I have had practical experience in steeping barley, both for horses and for sheep, but I did not like to go on with it after 1865.

2870. I want to know if you consider steeping barley an advantage for cattle ?—Decidedly; I have used it for my rams and my horses.

2871. And steeped barley you would think infinitely better than plain barley ?—Yes; it would make more flesh, and is easier of digestion.

2872. You know that that was stopped by the Excise ?—Yes; I was in London at that time.

2873. It is your opinion that being permitted to steep barley, and also (supposing the duty were taken off malt) to have malt only free, would be a great advantage to the farmer ?—I am sure of it.

2874. You have heard of Mr. Gladstone's Act, malt for cattle feeding purposes ?—I have.

2875. Has it been tried down in your part of the world ?—I should think not, I have not heard of any instance of it.

2876. Why has it not been tried ?—Simply because it was ground too small. I should not think of using it with my valuable stock.

2877. You know that that Act has been a failure through the country, do you ?—Yes.

2878. There was another Bill that was passed, the Malt by Weight Bill ?—I know nothing at all about that.

2879. Do you brew for your people for haying and harvest ?—Yes.

2880. Is it the custom in your county to brew for the labourers ?—It is the invariable custom, except in one or two instances.

2881. Have you any men who brew for themselves ?—No.

2882. It is not the custom of the country for them to do so ?—It is not the custom of the country.

2882*. Do you find it a great advantage to brew for your men in haying and harvest instead of giving them money to go to a public-house to get beer ?—I can safely say that if I offered to give my men money I should not get my harvest in, they will not work without beer.

2883. Supposing you offered to give them money to have the beer from the public-house, would they rather have the beer from the public-house or your beer ?—They would far rather have my beer.

2884. Do you find that the public-house beer is injurious to them ?—Almost invariably.

2885. Do you believe that that public-house beer is very much adulterated ?—I do.

2886. Do you find that it has a bad effect upon the men afterwards, and injures their health ?—Yes.

2887. How much beer do you allow them ?—Three quarts a day in hoeing turnips, and six quarts a day in the harvest.

2888. Do you mean of the best beer ?—No, certainly not; I generally brew 2 bushels of malt, 8 lbs. of sugar, and 3 lbs. of hops to about 110 or 112 gallons of beer, according to the size of the cask; and for my October ale I mash up 16 bushels of malt, and about 20 lbs. of sugar, and 18 lbs. of hops, to brew about 120 gallons of what I call ale. That ale will keep sound and good for two years, and I always try to keep a barrel over two years if I can, because it improves; that we use for mixing, and on carrying days. We generally give the men about half their allowance before the middle of the day; and then after the middle of the day, we mix a quart of this old ale with the other portion.

2889. I suppose you have turned your attention to the fact that the malt tax produces a large amount of revenue, and that supposing the malt tax were taken off, it might be found necessary to impose a tax on something else ?—I should like to see a portion of the tax off; I am sure it would help us; and I would rather see it on beer, on the manufactured article.

2890. You think that that would be both a

fairer

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fairer tax for the producer, and a better tax for the consumer also?—Yes; I think so.

2891. It would enable you, at any rate, to do what you pleased with your raw material?—It would.

2892. And you do not think that it would be any hardship to the brewer to have a tax on beer instead of on malt?—I cannot see why it should, because I believe there would be more surveillance, and less rubbish put into the beer.

2893. How would you deal with the private brewer, because the private brewer now pays the tax on the malt?—I am all for letting classes share and share alike. I should like a farmer to pay for his farm horse and shepherd dog, and everything else like a commercial man, and that the Government should give us free trade in its integrity, with our barley crops included.

2894. Supposing that some means, not inconvenient to the farmer, could be suggested of imposing a duty in some way, in lieu of the malt tax, you would see no objection; supposing it were according to the number of men you employed on your farm, for instance, or the number in your house, or something of that kind, you would have no objection to that?—No; I know I should be better off than I am now.

2895. In fact, your opinion is that you would be better off if the malt tax were repealed, even though the tax was placed upon beer?—I believe so.

2896. Sir *E M. Buller.*] Are those samples of barley which you have exhibited to us, the best and the worst barley grown on your land last year?—They are.

2897. That inferior barley is a good malting sample, is it not?—It is.

2898. But barley of a much lower quality than that, would be useful as malting barley were there no tax, would it not?—I am sure it would.

2899. The tax falls heavily on the lower class of barley?—Decidedly; on the lower class of barley the tax falls the heaviest.

2900. Is not this correct, that if you sell your barley at 50 *s.* a quarter, and the tax in the shape of the malt duty is 1 *l.* 0 *s.* 8 *d.*, that is as nearly 40 per cent. as possible?—Yes.

2901. If your barley is worth 42 *s.* a quarter, or 84 *s.* on two quarters, then the duty comparing it with the 84 *s.* would be higher; but if you take a lower class of barley still, the class of barley which sells for 32 *s.*, if that should be converted into malt, then the tax as compared with the price upon two quarters would amount to 41 *s.* 4 *d.* upon 64 *s.*?—Yes.

2902. That is as nearly as possible 66 per cent.?—I have not worked those figures out myself, I dare say that is so.

2903. At all events it is the case that the lower the price of the barley the heavier the tax presses upon it?—Quite so.

2904. And therefore that tax operates to prevent any inferior class of barley from being malted?—It does very materially.

2905. It makes a difference in the price of that inferior barley, inasmuch as it cannot be used for that purpose?—Yes.

2906. Can you tell us the price of your beer that you make from the two bushels of malt and the 8 lbs. of sugar?—I have not made a calculation of that.

2907. You made 110 gallons in that case, I think you said?—I made 110 gallons from two bushels of malt.

2908. And that would cost you about 16 *s.* for the malt?—Rather more than that. I should put it 8 *s.* 6 *d.* a bushel for the malt, that is 17 *s.* for the two bushels.

2909. Three shillings for the hops?—I should put 3 lbs. of hops for that quantity, and the hops would be at least 1 *s.* 6 *d.* a pound.

2910. That will be 4 *s.* 6 *d.* for the 3 lbs. Then the sugar will be about how much?—Four shillings.

2911. That is 25 *s.*, and for that you brew about 110 gallons?—Yes.

2912. That will be about 3 *d.* a gallon, will it not?—It should come a little under a penny a quart.

2913. Mr. *Cave.*] You use the common brown sugar, I suppose?—Yes; but not the very inferior sugar. I should give about 5 *d.* a pound for what I use, it is good preserving sugar. There is no economy in buying inferior sugar.

2914. Sir *E. M. Buller.*] That, you say, is good wholesome beer?—It is good wholesome beer; of course it is the smallest beer, but I should have no objection to drink it myself.

2915. Then your next quality is very much more expensive, for that you take 16 bushels to 120 gallons?—Yes; about two quarts of that would astonish anybody in its effects if he drank it; he would feel that he had taken something to drink.

2916. You make that yourself?—Yes, every October; I generally have three brewings.

2917. What would be the price of that better quality; about 2 *s.* a gallon?—Yes, very likely; that would be 6 *d.* a quart. But I always brew at the same time 100 gallons of beer, the actual cost, thus:

	£.	*s.*	*d.*
16 bushels malt, 9 *s.* - - - -	7	4	–
20 lbs. best hops 1 *s.*, 8 *d.* - - -	1	13	4
20 lbs. sugar (added to beer), 5 *d.* -	–	8	4
£.	9	5	8

giving a result approximating—

	£.	*s.*	*d.*
120 gallons ale, 1 *s.* 3½ *d.* - - -	7	15	–
100 gallons beer, 3¾ *d.* - - -	1	11	3
£.	9	6	3

2918. Lord *Eustace Cecil.*] Is there any cottage brewing in your part of the country?—I think there are one or two farmers in the neighbourhood of Bridgenorth, that give their labourers malt.

2919. Do the labourers prefer it?—In some cases, but they often have wretched materials for brewing it.

2920. If the malt tax were taken off, do you think that the labourers would prefer it?—I question that; I think they would buy their beer.

2921. You have stated the benefit that would result to the farmers, namely, that it would enhance the price of inferior barley, what benefit would it be to the labourer?—I think, in all probability, the labourer would get a better beer from the inferior barley, and it would do him more good.

2922. And that would stop the public-house trade all over the country?—No; I think not.

2923. Where beer was supplied instead of money, the labourer would never go to the public-house?—He would rather buy a barrel of beer the

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the same as I do myself; the labourers have a great objection now to what is bought; I bought 400 gallons of beer at a sale at Bridgenorth some fortnight ago, and I gave 10 *d.* a gallon for it, but as soon as my men saw it come on the premises, they became rather dissatisfied.

2924. You think that that beer which, probably, would be brewed by a labourer, if not so strong as the public-house beer, would be, at all events, much purer and more wholesome?—Yes, much purer; I feel convinced of that.

2925. Major *Parker.*] You have shown us two samples of barley; I think they are grown in the same field?—No, in adjoining fields on land of the same quality; one after turnips and one after wheat, but it was the same quality of land; I do not think you could tell the slightest difference.

2926. I want to understand in what way you think that the malt tax operates to your prejudice in growing the best barley; your better sample is after wheat?—Yes.

2927. What would be the objection to taking it after turnips?—Simply because the barley is not worth as much by 8 *s.* a quarter, the same as you see in that sample there.

2928. Then, for that reason you consider that the malt tax operates to your prejudice?—I think that the malt tax operates to our prejudice on both lots, but certainly more in the inferior lot than it does on the best.

2929. I think you mentioned that you grow white wheat?—White wheat entirely; I have not grown red wheat for five or six years.

2930. Mr. *Henry Surtees.*] I think you said that you would not use malt and linseed ground very fine for your stock, under Mr. Gladstone's Act; for what reason would you not use it?—I would not use it for sheep, because a sheep has a very singularly formed stomach. When the food is taken bit by bit into the rumen it is passed down into the bottom of the stomach; that is larger at the bottom than it is at the top, and it is wrapped down in folds in this kind of way (*describing it*), and the food is passed into these folds one by one, so as to prevent a great weight of food lying on the bottom of the stomach at once. It has to lay there for some time, before rumination begins. It is sometimes imagined that what goes into the sheep's mouth last, comes up first from the rumen, but that is a great mistake; the food from the botton of the stomach is passed up first into the œsophagus, and from that, when again masticated, into the second stomach. When you put a lot of succulent food and a mixture of ground linseed, which would be as fine as flour, together, it settles into a dead mass in these folds, and the sheep have the greatest difficulty in removing it or passing it, and in nine cases out of ten an unhealthy action of the stomach is caused, and often scour and death; but if you give it to a sheep in this way (*pointing to a sample*), he would eat it rapidly, and it lies loose; the linseed swells, and the malt would then act, and from lying in that kind of loose crumpy state, especially mixed with a little hay, it would pass more regularly into preparation for the second stomach. We find all fine meal very clogging to the appetite; in fact, the sheep will hardly take it; they will blow it about with their noses, and try to find something to pick out with their teeth, but if you give it to them like that (*pointing to the sample*) they will eat all of it, and it is astonishing with what avidity they take it, and how much better it suits them. In fact, for years I have not given sheep meal.

2931. Mr. *S. Cave.*] It makes a concrete?—Yes; it makes a concrete in the stomach.

2932. Sir *E. M. Buller.*] Do you give them barley or malt whole?—I always give them malt whole.

2933. Mr. *More.*] Do you exhibit at the leading agricultural shows?—Yes.

2934. Did you exhibit at the Royal Agricultural Show at Bury last week?—I did.

2935. Were you successful?—I was.

2936. Did you feed your sheep on malt?—When they were young; but as I exhibited ewes there, I did not wish to push the ewes to that state of fatness to go to the Royal Agricultural Show, which is a stock show; I therefore did not give them any malt at all.

2937. What is your opinion of Mr. Lawes's experiments?—I have looked them carefully over, and if I did not feed sheep any faster than Mr. Lawes, I should have a very poor annual ram sale.

2938. You do not agree with his conclusions?—I do not. I do not think that he started right or in any way to arrive at a fair conclusion about malt. I should never dream of conducting an experiment with malt alone.

2939. How should you have conducted the experiment?—With a portion of malt mixed with other food, decidedly, so as to get the benefit of the action of the diastase in the stomach of the animal.

2940. Do the farmers in your district find Mr. Gladstone's Bill any boon for them?—Not the slightest; I never heard of its being tried.

2941. *Chairman.*] In what proportion should you mix malt?—I never gave an animal half a pint in my life. But for Birmingham wethers it is very difficult to keep them on for the last three weeks, and then I should take a largish portion of other food away, and give them rather more malt.

2942. How much malt would you give them?—I dare say half a pint, but I dare not go on with it for many days; it is a most satiating thing. I never found my sheep to eat much more than a pound weight of corn a day, half a pound of oil cake, quarter of a pound of mixed peas and beans, and perhaps about a quarter of a pound of malt.

2943. Mr. *More.*] Do you know the Wolverhampton markets, and the other markets in your neighbourhood?—Yes.

2944. Have you a large acquaintance with farmers?—Yes.

2945. Do you think that the farmers in your neighbourhood would be disposed to use malt in feeding?—I am quite sure of that; I have some letters on the subject which perhaps I may be allowed to read:—"Ercall-park, Shrewsbury, 20 July 1867. Dear Sir,—As I understand you are going to give evidence before the House of Commons in favour of the repeal of the malt tax, I thought a few hints from a successful exhibitor of sheep at the Royal and other shows might not be out of place. I give mine about half a pint per head per day mixed with other grain, and only for the high duty I should give it to the whole of my lambs, being convinced that it is the lightest and most digestible food for all young animals, and would supersede those farinaceous mixtures we know nothing about. I remain faithfully yours, *Thos. Mansell.*" That is a letter from Mr. Mansell, who took two prizes in the late Royal show at Bury St. Edmunds, one at Plymouth, last year, and also at the Bath and West of England Society's meet- g at Salisbury this year. The gentleman who rote the next letter, that I am about to read, ok four prizes at Bury this last week: "Uff- gton, Shrewsbury, July 20, 1867. My dear r,—I intended to have had some conversa- on with you at Bury on the subject of malt food for cattle, but being obliged to leave en for London, on Wednesday, I was pre- nted from again seeing you there. I am desirous informing you that I have for some time ed it occasionally for sheep and cattle, and ways with the most satisfactory results. I con- ler that my lambs are much more healthy and ow faster, and that my sheep fatten much uicker when their food has been mixed with alt. I am also quite sure that it is an excellent ing for young cattle" (this man is a short-horn eeder as well), "especially if they are in a eak and reduced state, as it not only conduces the healthy action of the stomach and intes- nes, but is also a safe and effective stimulant. I ly wish that by the removal of the present nposts, we may have the opportunity of using more freely. Believe me yours very truly, *hn Evans.*"

2946. *Chairman.*] Is Mr. Evans a large far- er?—He is a large farmer; he farms, I daresay, 0 acres of land. All these gentlemen whose tters I am reading farm as much as 500 acres land. The next letter I propose to read is is:—"Sarawardine Castle, 20th July 1867. ear Smith,—Being informed that you are going give evidence on the malt tax question, I beg say that I have used it for sick cattle when ey would eat nothing else, and the heifers are ive now. Yours truly, *J. W. Bowen.*" I ceived this letter yesterday morning.

2947. Mr. *More.*] Do the farmers generally in our part of the country feel the malt tax to be great grievance?—They do.

2948. And do they feel it to be a grievance to onsumers?—Yes.

2949. What substitute do they think of; have hey discussed that question?—No, they have ot; I think they consider it pretty well a hope- ss one.

2950. Are you in favour of the beer tax?—I o not much like the beer tax, but I would rather ave the beer tax than the present high impost n the malt.

2951. Mr. *Arthur Peel.*] Did I rightly under- tand you that your surrender of the four-course ystem was owing to your taking to sheep- arming?—Not owing to my taking to sheep- arming; but I found that I could work my farm n a better way.

2952. But, generally speaking, you can say hat the malt tax interferes with rotation of rops?—Yes, I have no hesitation in saying hat.

2953. Is there any tendency among farmers to ollow your practice of giving up the rotation of rops?—Yes.

2954. And therefore the abolition of the malt ax would not have so much effect upon them?— f we do not sow our spring wheat in February we stand little or no chance of getting a good rice. We find about the first week in April as good a time as any for sowing that best sort of barley; it puts us to expense and inconvenience, and it damages the land too, removing all the turnip crop.

2955. How does the malt tax prevent that particular rotation of crops?—Simply because we grow an inferior class of barley, which we cannot sell because of that tax; the maltsters will buy the best qualities, and they will not buy the worst, and consequently we run as little risk as we can of growing the inferior sorts.

2956. Have you any fear, in the event of the malt tax being repealed, of the competition of foreign barley?—Not the slightest, because, I think, they bring in now as much as they possibly can.

2957. Mr. *Dent.*] I do not quite see what you mean about this: you say that the growth of the second-class barley is checked by the malt duty?—I do.

2958. You are checked in growing it because the price is low?—Of course, the lower the price the greater the duty is, comparatively.

2959. Will you explain why the growth of the second-class barley should be checked by the malt duty?—I would rather have it put to me in the form of a question.

2960. You state that you have altered your rotation of crops in consequence of the malt duty; I want to know why you have altered your rotation?—Because I can grow a first-class quality of wheat, and I can only grow a second-class quality of barley.

2961. But then that is not the malt duty; you can grow good wheat and you grow bad barley?—If it were not for the malt duty, there would be a great deal less difference between those classes of barley which I have shown you, than there is at present.

2962. Do you mean that the best barley would be lower in price?—Not such barley as that better sample there, but a medium barley would be, perhaps, rather lower in price, and the two would blend together, because that brown barley will make as good malt as the white.

2963. Do not you think that, taking England through, there is a very large proportion of barley grown between those two barleys; that there is a much larger quantity grown between those two qualities than is grown of either of them?—Yes.

2964. Then it would be rather an injury to the farmer if you lowered the price of that medium barley?—When I say "lower," I mean that the two would approximate more together; I think that the consumption would increase so vastly as to check any idea of a diminution of the price.

2965. In what way would the increase of consumption be; would it be from the use of malt for stock?—Vastly from the use of it for stock; and I think that where farmers now only give their men beer, grudgingly, about two months in the year, they would give them beer all the year round.

2966. Do you think yourself it would be any advantage to the labourers giving them an extra quantity of beer instead of wages; because I presume that, if they do not give them beer, they must give them wages?—I am quite sure about it, that the labouring man will not have wages in lieu of beer, for he cannot do his work as well without it, and I am certain, from my experience of farming within the last 16 years, that where a man has had about three quarts of beer from my own table every day, there has been a marked improvement in his wife and family.

2967. How does the improvement affect them? —Simply

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—Simply because he shares it with his wife and children every day.

2968. You supply him with that at his own home, I presume?—From my own table.

2969. Do you think that this quantity of beer which you give at ordinary times, is ordinarily shared in the family by your labourers as a rule?—If ever they can get the chance, the women and children always partake with them in the harvest field.

2970. If the growth of second-class barley is checked by the malt duty, it is checked because the price is not remunerative, I suppose?—It is not remunerative.

2971. Then you think that supposing the malt duty were repealed, there would be a great deal more of the second-class barley grown in the country?—I think there would; I do not say that it would be inferior barley, it would be inferior simply in consequence of the weather, and the seasons, and all that kind of thing; but there is plenty of land now that men will not grow barley on, because of the low price it fetches, on account of its colour, and that is because of the tax.

2972. Do you think that barley bears a low price in proportion to wheat, and in proportion to other grain generally?—The brown barleys do certainly. We have had barley as low in our market as 12 *s.* for 10 scores, while peas are worth 18 *s.* for 10 scores, and beans 20 *s.* for 10 scores. We sell anything in the feeding way by weight, 10 scores is 200 lbs. But I am very sorry to tell you that if I go to Wellington, or to Wenlock, to Bridgnorth, or to Wolverhampton, they have all different weights and measures.

2973. In this paper, which you have put in, there is not contained the whole of your arable land?—There is not; I had not time to make it out; I will finish it.

2974. The malt you use for your sheep, you mainly use for lambs at the time of weaning, and again when getting rams, or feeding sheep up to the highest point for show?—Yes.

2975. Have you ever used any dry barley for feeding sheep?—I should as soon think of using strychnine, it is the most indigestible and the worst stuff I ever used. With regard to barley, if you get it 12 months old it loses a great deal of that character, but as for using it in the crude state the first year it is grown, I have killed my lambs by scores with it.

2976. Have you used dry barley for old sheep?—I have done it, and with the worst results. I never give it them now.

2977. Mr. *Cave.*] Do you ever get any foreign barley in your neighbourhood?—I sometimes see it in the market, we never buy it. I may say that I use dry barley as food for horses, crushed, but never for sheep.

2978. Do you use barley alone, instead of oats for horses, do you mean, or is it mixed?—I should generally mix it, barley and oats and beans, and a little bran.

2979. In speaking of the injury that fine meal does to sheep, would you apply your remarks to other sorts of stock?—I would to a ruminating animal. I do not think it would make that difference to a bullock that can get plenty of straw to eat with it; but as to rearing calves and young things, I should never give them that.

2980. *Chairman.*] With regard to this rotation of crops, as I understand you, the reason that you do not grow barley, but grow spring wheat, or rather the reason that you now grow more wheat than you do barley, is because you do not like to run the risk of growing an inferio crop of barley?—Exactly so.

2981. And because the duty being upon malt you have not so ready a sale for that barley?—For that class of barley I have not.

2982. And because you can grow wheat that does pay you, although it is not so good for the land, and although it costs you more money to grow it?—Exactly so.

2983. Then I may take it that your opinion is that it is better to grow the wheat than to run the risk of growing a crop of barley, it being a risk; your endeavour being to grow the best class of barley, but the risk being so great that you may grow the inferior class, you grow the wheat instead?—Yes; I should say, looking at the best course to pursue for the land, it is rather a scourging course to pursue to take wheat so often.

2984. And if it were not for the duty you would grow more barley?—Yes.

2985. Sir *E. M. Buller.*] Can you tell me the difference in price between the lowest quality of barley you sell for malting purposes and the best quality you sell for grinding purposes?—That would be full another 10 *s.* below that brown barley; in fact, more than that. Grinding barley is the cheapest thing that we have in the market.

2986. If I may so describe it, there is a great gap between the price of malting barley and the price of grinding barley?—Very great.

2987. And were it not for the malt tax, a considerable portion of that barley which is now grinding barley, sold at that very low price, would be fit for malting purposes, and would rise nearer to the price of malting barley?—Yes.

2988. You are liable to accident, and that accident reduces your barley from malting barley to grinding barley?—Yes.

2989. And you would say that on the quarter there is a difference in price of something like 10 *s.* between the one and the other?—Yes, quite.

2990. And, therefore, a bad season reduces the price of your crop 10 *s.* a quarter, or 1 *s.* 3 *d.* a bushel; and that, taking your barley crop at 30 bushels an acre, is a loss of something like 38 *s.* an acre?—It would almost make that difference.

2991. That is the reason why, under present circumstances, you do not risk the growing of so much barley?—Yes.

2992. A good crop of barley, if I understand you rightly, pays you as well or better than any other crop, but an inferior crop of barley, inasmuch as it becomes almost unsaleable, is a great loss?—Yes; I do not think it will be any harm for me to state that, at the time I was making 6 *s.* 6 *d.* a bushel of my barley, I bought some seed at 4 *s.* 8 *d.* a few miles off.

Thursday, 25th July 1867.

MEMBERS PRESENT:

Colonel Barttelot.
Sir Edward Manningham Buller.
Mr. Stephen Cave.
Lord Eustace Cecil.
Mr. Dent.
Colonel Duncombe.
Mr. Goschen.
Mr. Shaw Lefevre.
Major Parker.
Mr. Arthur Peel.
Mr. Read.
Mr. Henry Surtees.

COLONEL BARTTELOT, IN THE CHAIR.

Mr. ALBERT PELL, called in; and Examined.

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2993. *Chairman.*] I THINK you live at Haselbeach, in Northamptonshire?—I do.

2994. I think you farm largely, do you not?—700 acres; 685 exactly, I believe.

2995. Is that in Leicestershire?—Part of it is n Leicestershire, and the other part is in two divisions of the county of Northampton; one in the southern division, and one in the northern.

2996. I think you own land both in Leicestershire and Cambridgeshire?—I own a small property in Leicestershire and a small one in Cambridgeshire, in the Isle of Ely.

2997. You have also property in London, I believe?—I have also property in St. George's-n-the-East, in London.

2998. You are chairman of the Central Chamber of Agriculture, I believe?—I am for this year.

2999. You have naturally turned your attention very much to the question of the malt tax, I presume?—I have for several years.

3000. Let me now first ask you, is yours a good barley district?—The farm that I occupy in the southern division of Northamptonshire is good barley land; it grows good malting barley. On the farm that I occupy in the northern division of Northamptonshire the growth of good malting barley is exceptional; it grows the second class of barley. The farm that I farm in Leicestershire, I have never until this year grown barley upon at all.

3001. Is your Leicestershire farm heavy land?—Yes, I think you might call it heavy land. I feed my sheep upon that land, but still it is land that is very much heavier than the Northamptonshire land.

3002. With regard to the farms in North Northamptonshire, is that heavy land or mixed land?—That is mixed land, some of it is a heavy land, and all of it is what you would call a rather dirty land.

3003. With regard to your farm in South Northamptonshire, what is the character of the land?—A dry red ironstone.

3004. Sandy?—Sandy, distinctly.

3005. If I understand you right, on your South Northamptonshire farm you grow a good quality of barley?—I grow there a good quality of barley; barley fit to malt.

3006. What effect do you think the malt tax has upon that best quality of barley?—I think that I can hardly say that it operates very seriously against the price. I believe that, to a certain extent, I come in with the monopolists on that land.

3007. We have had it in evidence that if the malt tax were repealed it would increase the price of the best classes of barley as much as 5 *s.* a quarter; is that your opinion?—I can hardly answer that. I believe that with regard to even a higher quality of barley than what I grow in South Northamptonshire—that is to say the pale barley, the price of that might rise after the duty was taken off, but to what extent it is beyond me to say.

3008. It is the Burton brewers that principally buy the best quality of barley in your district, perhaps?—For one quality of beer, that is to say, the pale beer, they buy the best barley, but for the strong brown beer they would buy my barley that is grown in South Northamptonshire. I do not think that there is much barley grown in our county of the finest quality for pale beer.

3009. The barley you grow in North Northamptonshire I presume to be malting barley, but not of so good a quality as that which you grow in South Northamptonshire?—There is no doubt that it would be malted if the the tax did not operate against its being used for that purpose.

3010. Do you not grow any malting barley in North Northamptonshire?—It occasionally goes for malting, but it depends upon the season.

3011. Is it your opinion that if the malt tax were taken off, the second class of barley would be much nearer in price to the best class barley, that is to say, that there would be a much readier sale for the second class of barley than there is at this moment?—I have no doubt about it.

3012. The maltsters would then be inclined to buy the second class of barley which now they will not look at?—They could buy it at greater advantage than now; I will explain how it would operate in this way: supposing 40 *s.* to represent the price of the best quality of barley now, and 30 *s.* to represent the price of the second quality, there is a difference between those two qualities, as barley, of 25 per cent. When you have added

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the duty to them, and they are converted into malt, that difference is altered entirely. If you worked the sum out it would be found that there is a difference of only 20 per cent; that is 5 per cent. difference created which is not created by the process of converting it into malt, but is created by the excise regulations; and, therefore, it is obvious that the second class barley is put at something like the disadvantage of the difference between 20 and 25 per cent.; that is to say, assuming those figures which I have given to represent the fact, which they may not do precisely.

3013. If I understand you correctly, and stating it in rough terms, and taking the barley which is now 40 *s.* and the barley which is now 30 *s.*, supposing the malt tax were taken off, the barley now worth 30 *s.* would be worth 35 *s.*?—It would rise in value, distinctly.

3014. Mr. *Dent.*] Did you mean that there was 25 per cent. difference in the value of the barleys, and only 5 per cent. difference in the value of the different qualities of malt made from those barleys?—What I stated was this: assuming the prices to be 40 *s.* and 30 *s.*, there is a difference between those two sums of 25 per cent.; when you have added the same amount of duty to each of those prices you will find that there is a difference of only 20 per cent. between the sums total; 40 *s.* and 22 *s.* is 62 *s.*; 30 *s.* and 22 *s.* is 52 *s.*; which is as near as possible a difference of only 20 per cent. in the malt, starting with a difference of nearly 25 per cent. in the barley.

3015. You brought out a difference of 5 per cent., I thought?—That is the difference between 20 and 25 per cent; the difference varies 5 per cent. upon the manufactured article as compared with the difference upon the barley alone.

3016. *Chairman.*] Then your decided opinion is, that if the malt tax were repealed, the inferior classes of barley would find a better market, and also realise a better price?—They would have another market opened to them which is now closed, and therefore they would have a better demand.

3017. I think you stated that on your Leicestershire farm you did not grow any barley at all?—I have had that farm, I think, for eight or nine years, and I have never grown any barley until this year upon it.

3018. Has the malt tax had anything to do with the rotation of crops which you have used on that Leicestershire farm?—That was not what influenced me on this occasion in commencing to grow barley upon that farm. I am growing barley there after a white crop now with artificial manure, very much as an experiment.

3019. You have now commenced to grow barley there?—I have for this year.

3020. But is it your opinion that the rotation of crops is interfered with by the heavy duty upon malt?—Yes; I should say it is upon certain classes of land, distinctly.

3021. Are those the heavy classes of land?—The class of land that grows the second-rate barley.

3022. And is it your opinion that barley would be grown on that land in its proper rotation, providing there was no malt tax to interfere with the sale of the second-class barley?—I think it would, and it would also be grown more frequently upon that land; that is to say, it would be taken as a catch crop.

3023. Speaking as a practical farmer, supposing it were the six-course system, you would grow barley in its proper course, supposing it were not hampered with the duty?—I should probably alter my course, if the result of the duty being taken off was to cause (as I believe it would do) an increased demand for this class of barley. On my heavy land I should take a crop of barley after a crop of wheat, with artificial manure, spending a larger capital in the cultivation of the land, but with the hope of a return.

3024. Are you under any agreement as to cropping your land?—The land which I occupy in North Northamptonshire is under lease. I am tied by no agreement till within the last four years of the lease, when I am under conditions to cultivate the land upon the four-course system. In South Northamptonshire, I am under no agreement except the implied one that the land shall be well cultivated, but not as to the course of cropping.

3025. In Leicestershire, are you under any agreement?—In Leicestershire, I am under no agreement whatever, except to cultivate it in a thoroughly good way.

3026. What I wish to know is, whether it is your opinion that the rotation of crops is altered by the malt tax?—I should think certainly it is; I have no doubt of it.

3027. And if it is so altered, is that detrimental to the good cultivation of the land?—It is detrimental to this extent, that all land likes a change, and so far as you cannot give the land the full range of cropping, it is detrimental to it. At least it is more detrimental to the community, perhaps, as you do not get all out of the land that might be got out of it, than it is to the land itself. I do not know how far land would be deteriorated by not growing barley upon it.

3028. Is not wheat largely substituted for barley in many districts?—Yes. In the parish of Naseby, for instance, near me, spring wheat is frequently grown instead, but that is not much the case in our neighbourhood.

3029. Is not that more exhausting to the land than taking a crop of barley in its ordinary course?—No, I think not, on our character of land.

3030. Your opinion then is, that the malt tax does interfere with the rotation of crops, but not to any great extent?—I think not to any great extent round us; it interferes more with the profit that can be got out of land.

3031. I think you said that the removal of the tax would increase the sale of the inferior class of barley; now, Mr. Gladstone introduced an Act which was called the "Malt by Weight Act"; do you know anything of the working of that Act?—Nothing whatever.

3032. Has it not come into use in your district?—It may have done so.

3033. That was for the benefit of the lighter class of barleys?—It was intended, I believe, to be so, but I know practically, as a farmer, that weight is not an accurate measure of value with barley, that it does not invariably follow that the heaviest barley has always the highest amount of brewing power about it, or is worth most in the market.

3034. There was another Act of Mr. Gladstone's, the "Malt for Feeding Cattle Act." Do you know anything of the working of that?—That is not applied in our county at all, but from what I have heard of it, I believe that it would be of no service to me. I have not attempted to use the

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e compound sold under that Act. It is too nely ground, and it is not the best way to give alt to cattle.

3035. You believe that the mixture of the linseed ith the malt, and their being so finely ground ogether, would prevent that Act being of the tility it was intended to be to the agricultural terest?—I think so. I should like to prepare e mixture myself if I had to give it to cattle. have my own mills and machinery, and so on, nd I should like to convert it myself into the reparation if I used it.

3036. Have you tried malt alone as food for attle?—Never alone; I have used a little this ear for animals that were sick.

3037. Not for bullocks?—Never for feeding.

3038. With what success did you try it upon he sick animals?—I am afraid that my animals ere stricken with a fatal disorder, lung complaint, and I do not think it had any effect. I now people who use it; it is used by men with hom I deal for my rams, and of whom I buy y thoroughbred bulls.

3039. Could you name the gentleman you allude to?—Sir William de Capell Brooke, of Market Harborough, is one; his bailiff used it, I elieve, for almost all their thoroughbred cattle. A Mr. Cresswell, of Ravenstone, in Leicestershire, sed it for his sheep; he is a ram breeder, and vas very successful at Bury the other day.

3040. Do you know anything of Mr. Henry Smith, near Shiffnel?—Only by name.

3041. Do you feed any sheep with malt?—Not t all.

3042. Or lambs?—None at all.

3043. Have paid any attention to some experiments that were made some little time ago by Mr. Lawes, with regard to feeding cattle and sheep with malt?—Mr. Lawes, I believe, has made experiments at two different times; one set in 1849, the result of which appears in the Journal of the Royal Agricultural Society, and which might be said to have been made in the interest of agricultural science generally, and another which was made at the instance, I believe, of the Inland Revenue. With regard to the first experiments, I have gone through them carefully, that is to say, I have read them through and formed my opinion of them. With regard to the one made at the instance of the Inland Revenue, I have just read an abbreviated report of them, and I know the character of the experiments, I believe.

3044. But you have not paid enough attention to them, perhaps, to know whether they were really fair experiments or not?—I do not think that they were fair at all.

3045. In what way were they not fair?—Because malt was used by Mr. Lawes in these experiments as a substitute for food; he ranged cattle on one side fed upon malt, to the exclusion of other feeding stuffs, and tested them against those fed on other feeding stuffs; he never used it, as far as I am aware (certainly he did not in 1849), as a mixture with other food.

3046. I think that the experiments given in the report were malt against barley, a certain amount of barley and a certain amount of malt, but he came to the decided opinion that barley was preferable to malt; is that your opinion?—He followed that course in 1849 I know, in those experiments which were published in the Journal of the Royal Agricultural Society. I could not give you any evidence as to how the malt alone would operate, but my own feeling is that it is an experiment that would not be of any great value. I should wish to see malt tried in addition to other food.

3047. Mr. *Read.*] In addition to other artificial food?—In addition to other artificial food.

3048. Mr. *Dent.*] Was not oil-cake used as well by Mr. Lawes?—I think not in 1849.

3049. *Chairman.*] Have you ever tried speared barley?—Yes, many years ago, when I was farming in the fens.

3050. What was your opinion of the effect of speared barley upon cattle and sheep?—I think that it was fattening; we used to use it for our horses.

3051. You found it advantageous to use it?—Yes, I think I did; I think that it was good food to give them. We used to wet wheat also, to spear wheat as well as barley.

3052. Do you know that lately the excise has interfered, and that that has been entirely stopped?—Yes; about four years ago I think they gave notice.

3053. Do you think that it would be an advantageous thing for the farmer to be allowed to spear his barley?—I should not make much use of it. I have an objection to any sort of corn lying loose and open, and unmeasured, for my men to come at, which with wet food of that character you must have; but dry malt which can be sacked up and weighed, and brought into your books, would not be open to that objection.

3054. Then your opinion is that, taking it altogether, malt might be very advantageously used for feeding purposes, provided there was no duty upon it?—I think that it might be used with advantage, certainly.

3055. Do you brew for your people in haying and harvest?—No.

3056. Do you give them malt instead, to brew for themselves?—No.

3057. Do you give them money, or do you find them beer?—In some instances I give money, but for the greater number of the people I find the beer.

3058. Where do you get that, from the public house or from the brewer?—From the brewer.

3059. Is that of a good quality?—I think it is; I believe it to be good beer. My brewer tells me that he uses nothing but malt and hops, and I have no reason to disbelieve him.

3060. Mr. *Read.*] And sugar?—I asked him that question lately, and he said that he had not, or that he was not using sugar this year, which rather surprised me, considering the high price of malt.

3061. *Chairman.*] What quantity do you give your labourers?—It depends upon the work which is being done. They will occasionally drink six quarts a day. I have had six quarts a day drunk by the men this year in carrying the hay.

3062. What class of beer is that?—That beer is the product of a mixing of beer at 1 *s.* 2 *d.* and beer at 4 *d.*, producing beer at 9 *d.* a gallon.

3063. It is not the custom, I think, in your county to give beer all through the year?—In Leicestershire they give beer for a longer period of the year than we do in Northamptonshire, but I think they give less in harvest; they give a little beer during the time that they are dunging the land for turnips; it is their rule, in fact, when the dung cart is at work, to give beer, but it is not the rule with us in Northamptonshire.

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The rule, however, is varying very much now under the pressure of higher priced labour.

3064. Do they give the beer instead of wages?—No, the beer is in addition to wages.

3065. But should you get your men to work provided you did not give them the beer?—I should get them to work, but I should put them at a great disadvantage if I did not give it them; they would require the beer, and they would go to the public-house, or send for it, where their shilling would go a very much less way than I should make it go by bringing the beer to my premises from the brewery.

3066. Do you think, provided the tax was taken off, that the labourers in your neighbourhood would brew at home?—No, I do not believe they would; I believe the tendency of the lower orders now is to have as little as possible to do with anything that gives them trouble, and brewing would be trouble.

3067. In what way would they procure their beer; would they go to the public-house as now?—No; I think that they would follow the practice adopted on my farm at present; that is to say, they would still take it from the cellar.

3068. Should you go to the brewer, or brew yourself?—I should continue to buy the beer myself.

3069. May I ask you why you prefer buying from the brewer instead of brewing for yourself?—I have an idea that brewing is a great manufacture, and that the brewer would conduct it upon more economical terms than I could as a small brewer, which I should become. But I wish to add that I am constantly pressed by one of my foremen, he being an old man, to brew, assuring me that I shall do very much better if I do brew; but he has not converted me to his way of thinking at present.

3070. Do you know anything of the public-house beer in your neighbourhood?—Yes, I do.

3071. Is that now of an inferior quality to the beer you get from the brewer?—Very inferior indeed, and very unwholesome.

3072. Is it, if I may use the term, drugged?—I have never watched the process by which they make it, but it has an exceedingly unwholesome effect upon me if I drink it, and upon my men too.

3073. Is it your opinion that if the malt tax were taken off, the public-house beer would be of a better quality than it is at this present moment?—I am hardly able to answer that question. I do not know how far a publican would be tempted to put the unholy profit in his pocket if he makes one, or how far he would let his customers have the benefit of any reduction. It would be cheaper, I have no doubt; he could not resist the appeal from his customers that the malt was cheaper, and therefore the beer ought to be cheaper; at least I do not see how he could resist that argument.

3074. What effect do you think the repeal of the malt tax would have upon the price of beer to the general consumer; have you turned your attention to that at all?—I think that it would have the same effect upon beer as upon all other of the prime necessaries of life, of which I hold beer to be one; we should get it better and get it cheaper. I do not know that we should get all the profit; there would be a redistribution of that among all classes of people in England.

3075. You are of course aware that the malt tax produces a large amount of revenue now, nearly 7,000,000 *l.* of money. I think last year it was 6,400,000 *l.*?—Yes.

3076. Supposing that that revenue could not be parted with, have you turned your attention to any substitute for the malt tax?—It is a subject that I have considered a little, but I do not know that my opinion would be worth much upon it.

3077. Do you think that there would be any objection to putting it on beer?—I cannot see any; but the brewers appear to have a great objection to it, from the inquiries I have made myself.

3078. Supposing that it were taken off malt and placed upon beer, do you think that it would be an advantage to the agriculturists?—I think it would be to them in common with all other consumers of beer; I think that the tax is put on at the wrong end at present, because a profit has to be made out of capital sunk in the malt tax, just as much as a profit has to be made upon capital sunk in coal or barrels, or anything else.

3079. Your opinion I gather is, that if the malt tax were taken off the malt, more malt and hops would be used in brewing than are used at present?—Yes; I think that there would be more malt used decidedly.

3080. Then, for the general public good, you think that the repeal of the malt tax would be advantageous?—Advantageous to all the poorer orders; distinctly to the class of people that I employ, where there is so very small a margin between income and expenditure.

3081. You have property in London, you have said?—I have; in St. George's-in-the-East.

3082. I think that you have a good many public-houses there, have you not?—Yes; I am sorry to say that they are very numerous indeed.

3083. Without going away from this subject at all, what effect do you think not only the malt tax, but the system which is prevalent throughout London, of having brewers' houses, if I may use the term, has upon the sale of beer as a good article for the poor man?—I think that the extra cost that is put upon beer to meet the licensing system and the goodwill of an old established house, which is something very enormous in London, leads to considerable adulteration in the beer, and also to the introduction into those houses of temptations of another nature, to bring people in, beyond that of simple thirst.

3084. I did not mention the licensing system, because I thought that it was rather going away from our subject and would lead us into a discussion of another nature, but I believe that that is a very objectionable system; further than that I will not go?—It is; it is not objectionable in the way of rent to me, but overlooking that it is to my mind exceedingly objectionable.

3085. Lord *Eustace Cecil.*] You said, that from your own personal knowledge, you knew that the brewers had some objection to the beer-tax; can you state what that objection is?—I believe that the objection is the introduction of the exciseman on to their premises. At present he operates chiefly in the malthouse; he would have to abandon that, supposing there were an exchange of the malt-tax for a beer duty, and come into the brewery.

3086. And they would look upon that as very vexatious and disagreeable?—They would. I have no doubt, I should myself if I were a brewer.

3087. Is that the sole objection they have?—

That

hat is the only one I have heard stated. I have heard of one other objection indeed, which is an nselfish one, on the part of a brewer, and one of he largest brewers in England, that the whole of he profit, in case of any reduction being made pon the malt duty, would go into his pocket, and ot into the pockets of the consumer.

3088. Do you think that the brewers would ave any objection to a license at all?—I suppose ere is a license at present.

3089. But would they have any objection to a cense on the beer actually sold?—I have never eard that objection stated.

3090. *Chairman.*] You know that there is now beer license, a commuted hop duty changed into beer license?—Yes, and also is there not a rewer's license; a license in proportion to the mount of beer brewed by them?

3091. But if that license were increased to eet the requirements of the malt tax, should ou think that there would be any objection in at?—I can see no objection in that myself, but ather an advantage.

3092. Lord *Eustace Cecil.*] Did you ever hear he brewers state that they would have any bjection to the license being increased?—requently. I talked this point over with a rewer last week; I went on purpose to hear hat his views were; it was my own brewer in orthampton.

3093. Is he a small brewer or in a large way f business?—He has no establishment at Burton, ut he has a very good country trade, and I would dd that although he lives in Northamptonshire, nd brews in Northamptonshire, he has bought r is renting malting houses in Hertfordshire and ssex, for the sake of obtaining that peculiar lass of barley which we say has a special protection given to it by the malt duty.

3094. *Chairman.*] Will you kindly mention is name and where he lives?—I allude to Messrs. Phipps of Northampton.

3095. Lord *Eustace Cecil.*] With reference to rivate brewing, you are quite aware that if there was a beer tax, the beer brewed by private persons would be equally excisable with the beer brewed by brewers?—I have no desire that they should be exempted, unless there could be any advantage given to the very poorer classes, those who live in low rented houses; but I do not believe that they would avail themselves of it; they do anything to save trouble, I think.

3096. You do not think that the agricultural interest, that the farmers, for instance, who brewed for their labourers, would have any objection to the visits of the exciseman?—They would have the same objection as the brewer has, they do not want him on the premises.

3097. But they would prefer the visits of the exciseman rather than have the malt tax as it now exists?—As far as my own feeling goes I would rather pay that which is due to the excise without the visits of the exciseman, if the revenue could be secured; that is to say, if it could be sufficiently protected.

3098. You would rather have private brewing in fact exempt if it could be?—No, I have no selfish feeling of that sort; I would rather have it exempt from the visits of any Government officer if the revenue could be collected without.

3099. But how could you collect the tax without, if there was a beer tax?—I have just turned the subject over in my mind, but what I could say about it would be worth very little, I think.

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3100. You are not prepared to make any suggestion as to the way in which it should be collected; you have not considered the point sufficiently?—I would rather not, in the absence of better evidence on that point, make any such suggestion.

3101. You spoke of the adulteration of beer; do you know what the beer is adulterated with, as a rule, when it comes from the brewer or the publican?—Not at all.

3102. Have you ever observed that there is a great amount of sugar in the beer that comes from them?—I know that there is a large amount of sugar in the beer that comes from the large brewers as well as in that which comes from the small ones.

3103. Do you look upon that as wholesome?—I do not believe that it is so wholesome as beer made from malt and hops.

3104. You have never observed bad effects produced upon your labourers by beer containing sugar?—I have observed that labourers, if they have bought beer at the public-house, do not work as well upon it as upon the beer that I give them; it makes them heady and talkative, and stimulates them, and does not nourish.

3105. But I suppose that there are other articles mixed with the public-house beer besides sugar?—I think there may be; probably tobacco and salt.

3106. Would that be the case with brewer's beer?—I have no reason to believe that the brewer's beer that I buy is adulterated at all.

3107. You have reason to believe that it is made with sugar, I think you said?—No, quite the contrary; I am told that it is not made with sugar. But there is a very great improvement in the manufacture of sugar for brewing purposes, and I have no doubt that my brewer will use it in a short time.

3108. If you brewed yourself, you would have no objection to use it for your labourers?—No; because I should have a special advantage; I should not be taxed for my sugar, while the public brewer would be.

3109. I mean looking at it on the point of health, do you think that it would be as good and wholesome a beer as that made from malt?—I cannot answer that, but I know that beer brewed with sugar does not keep as well.

3110. You cannot say what effect it would have upon your labourers?—No, I cannot say what effect the introduction of sugar into the copper would make.

3111. Colonel *Duncombe.*] Have you ever calculated the difference that would result in an economical point of view, to yourself if you brewed instead of buying your beer?—I have heard the assertion made (as I said before), by my foreman, that if I would consent to brew at home I should produce beer at about half the cost of what I buy.

3112. You now give 9 *d.*?—I give 1 *s.* 2 *d.* and 4 *d.*, and mix them.

3113. You give a mean of 9 *d.*?—Yes; and a little more of the better beer in the evening, as they approach the end of their day's work.

3114. You do not even brew for your own establishment?—No; I buy another sort of beer altogether for my own establishment. There luxury comes into the question, and not simply nourishment.

3115. Do the farmers in your neighbourhood never brew?—Yes; in many instances the farmers

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mers about me brew. I should think as many brew as do not brew.

3116. You think that if the malt tax were removed it would make little difference to private brewing; you would not brew yourself even if the malt tax were removed?—No; I should not. I believe that it is a business that would be conducted upon more economical principles by professionals than by myself.

3117. Do you use Burton beer, may I ask?—No, the beer for the Leicestershire farms is brewed in Leicester, and that for the Northamptonshire farms in Northampton; I was told one thing which might, perhaps, influence me with regard to brewing at home; my brewer says that the average cost of the carriage of beer from his brewery, that is to say, always taking his trade through, was 2 *s.* a barrel.

3118. It is your opinion that if the malt tax were removed, there would be a very great stimulus given to the growing of barley in England?—I think there would, certainly.

3119. And that the quantity grown would of course be very much increased?—Yes, it would be increased.

3120. Would that decrease the price of barley paid to the farmer?—No, I do not think that it would decrease the price of barley to the farmer, supposing the tax to be taken off, for I think that it would open up a new market.

3121. So that even if the growth of barley was largely increased in England, that would not affect the price to the farmer; he would not get a less price for it?—I do not think that he would get less, but more.

3122. Has the subject of the removal of the malt tax been discussed by the Central Chamber of Agriculture?—No.

3123. They have never expressed any opinion about it?—They have never expressed any opinion about it at present, it is to be discussed this Autumn, I believe.

3124. I believe that the members of the Central Chamber of Agriculture are composed generally of farmers from the Eastern counties?—No, they are composed of members from Northumberland down to Plymouth. There are about 30, I may say, large associations who work with us, and that is the growth of 12 months.

3125. But as far as you know, the farmers are prepared for some substitute so far as the present tax is removed?—I think they are.

3126. And you see yourself no other substitute but a tax upon beer?—A reduced tax upon beer; I cannot class beer with wine, or spirits as a stimulant, because I look upon it as one of the prime necessaries of life, particularly for the lower orders doing hard work.

3127. Major *Parker.*] Have you any reason to doubt the accuracy of your bailiff's statement that beer can be brewed by the farmer at half the cost he buys it at?—No, I do not know that I have; he is a careful man, and he has been with me a great many years; he might, perhaps, put it in the most favourable light with a view of inducing me to make a commencement of an undertaking which I should not willingly abandon after I have got the plant.

3128. I think you sometimes find it desirable or necessary to give, or at all events, you do sometimes give your labourers as much as six quarts of beer during the haymaking?—I do, and during harvest also.

3129. At the cost of 9 *d.* a gallon?—Yes.

3130. That would be 1 *s.* 1½ *d.* per head per day?—Yes.

3131. Would it not be a considerable diminution in the expenditure of the farm if each labourer were supplied with beer at the cost of 6½ *d.* a day; would it not be an important item in the farming arrangements?—I think he would get the benefit of that. The way in which it would operate with me, I have not the slightest doubt, would be to make me give him beer during the other periods of the year; that what I saved (if I may so speak) by the reduction of the tax, would be immediately spent by me in giving him beer at other periods of the year.

3132. In other words, were you have got to supply the beer yourself to the labourer, he would have, in consequence of the burthen of tax, to pay 6½ *d.* a day more for a necessary of life?—Yes.

3133. And as such, how is that looked upon by the farmers and labourers generally throughout your county?—I do not think that the labourers have considered the question any more than the labourers considered the question of the repeal of the corn duties.

3134. But it is a fact, nevertheless?—It is the fact, nevertheless.

3135. Taking it in regard to the men that are employed, it is necessary that from agricultural sources, somehow or other, in consequence of this tax, money should be paid to the extent of 6½ *d.* per head during the haying, and I suppose the harvest as well?—One shilling and three-halfpence would be the cost of the six quarts.

3136. But you look upon the burthen consequent upon the malt-tax as 6½ *d.* a head on the labourer?—I have never worked the figures out, but there is a great increase; beer is increased in price beyond the simple duty, I have no doubt.

3137. You have alluded to the fact of your giving your labourers as much as a gallon and a half a day, at the cost of 1 *s.* 1½ *d.*, and you ascertain from your bailiff, whose opinion you have no reason to doubt, that that would be made, barring the malt-tax at half the price?—Not "barring the malt-tax," excuse me; he meant if I would brew it at home, and consent to a domestic nuisance.

3138. Then you think that the abolition of the malt-tax would relieve the labourer, though not quite to that extent, yet very considerably?—Immensely; it would make a better man of him, I have no doubt.

3139. Mr. *Henry Surtees.*] Do you believe that the malt-duty tends to cause a monopoly amongst the maltsters and the brewers?—I know that the malting trade is getting into fewer hands; that the small malt-houses are disappearing; I have an instance of that near my own house.

3140. Do you think that that is at all brought about by the operation of the malt tax?—That is a question which I could not answer so as to say decidedly whether it is or is not.

3141. Do you think that the fact of small maltsters ceasing to act affects the price of barley?—I cannot say that it would, judging from the sale of other corn; my wheat, for instance. I find that the largest purchaser gives me the best price.

3142. But do you think that if the malt tax were repealed more barley would be grown?—I do.

3143. If more barley were grown there would be more malt dust and more grains available for feeding purposes?—There would be more residium.

3144. That

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3144. That would be beneficial to the farmer, ould it not?—It would, certainly; it would be incidental advantage.

3145. Should you see anything to fear from e imports of foreign malt, or from more barley ing brought into this country, if the malt duty ere repealed?—I should not myself, because I eak in the interest of the consumer.

3146. You have no fear as to its injuriously ecting the farming interest?—Certainly not, timately.

3147. Mr. *Read.*] You said that this year you e growing barley in Leicestershire for the first ne?—Yes, I am.

3148. Is the increase of barley general in Leistershire?—I do not think it is.

3149. Is the tendency in your part of the world put down land to grass, or to break up grass nd?—Latterly to put land down to grass.

3150. What do you attribute that to, to the reased price of labour or the small price of rn?—In Leicestershire I attribute it to the ineased price of labour; there the stockingers ve in some instances subsidised the agricultural bourers during a strike; but in Northamptonire, I think, you can trace it distinctly to the w price of corn.

3151. And to the low price of your inferior rley?—Very much so.

3152. Do you, on your farm in Northamptonire grow more grass than you did formerly?—I ve laid down a little there.

3153. Have you let your seeds lie two years? I let my seeds lie two years always now, t I should break those seeds up again if anying like the present prices continued, and work em one-year seeds instead of two.

3154. And if you could have a better price for ur inferior barley you would keep more land der the plough?—I think, with a better price barley, I should not follow the practice very g of two years' seeds.

3155. Have you ever lived in any other part the kingdom besides Northamptonshire?—I ve, in the Isle of Ely.

3156. Have you lived in the neighbourhood of ndon?—I have, at Pinner.

3157. In that neighbourhood has the land been t to grass, or is it under the plough as it used be?—A great deal of it has been laid down to ass within the last eight or nine years; I might y that many hundred acres round Pinner have en so laid down.

3158. Although it may be more profitable to e farmer to put land to grass, what is the result the community?—Less employment for the al labour and less expenditure of capital in the y of money to tradesmen, building of premises, d use of implements.

3159. And what about the production of food? We should get more food off the arable land, a rule, than off the grass land.

3160. The lower orders with you do not brew home?—No, they do not.

3161. Do they bake at home?—No, they do not.

3162. I suppose there would be no particular vantage in making a sack of flour into bread er manufacturing a peck of flour into bread?—hey would buy the four pecks together of which e sack is composed at a less price than one ck out of the sack.

3163. But is it your opinion that they do not rew and do not bake at home in consequence of her people doing it better for them, or because they shirk trouble?—I think it is because of their shirking trouble; I do not think they have gone into the question of price.

3164. You would consider brewing a household nuisance, and would rather be without it?—I would myself.

3165. It is not so much a question of economy with you as of comfort?—Economy does not enter so much into the consideration on my own account; the price I should not regard if I got the beer I want to drink, but it is not so with the labourer.

3166. If we have a beer tax instead of a malt duty it would cheapen malt, of course?—It would decidedly.

3167. And so produce a better sale for the inferior barley?—Certainly.

3168. And you think that if malt was much cheaper, beer generally would be better?—I do.

3169. And that there would be less inducement for adulteration?—Yes.

3170. You are aware that the exciseman has access to the brewers' premises now at all times?—Yes.

3171. And that the brewer has to give notice of the brewing?—I am aware of that.

3172. And also to leave the grains and the mash to be measured?—Yes; I am aware of that.

3173. Then the only difference would be, that the exciseman would be more constantly on the brewery than he is at present if we had a beer tax instead of the malt tax?—I think that the effect of it would be that the exciseman would do his duty with more precision and more care than at present, because there would be a larger revenue concerned in the beer than there is at present.

3174. Then the malt houses would be free from his visits, and he would double his vigilance in the brewery?—Yes; at present his visits are divided between the two manufactures.

3175. And if there were adulteration in the brewing of beer he would have a better chance, of course, of finding it out?—Certainly; he would be more frequently on the premises, and more likely to find it out.

3176. The honest brewer would not have much to fear from his visits, you think?—I do not think that the honest brewer would have much to fear from his visits; supposing that there was a definite arrangement as to what the beer duty should be, he would have nothing whatever to fear from the visit of the exciseman, the object of that visit being to obtain revenue.

3177. Do the maltsters in your district buy your barley, or go to other counties for it?—They are going now very much to other counties.

3178. What counties?—Essex and Cambridgeshire.

3179. And are you aware that the growers of those better classes of barley are the most clamorous for the repeal of the malt tax?—I was not aware that they were the most clamorous. I was aware that they joined with us in the demand, but to what extent I do not know.

3180. You do not know that the direction of the malt tax repeal cry is more generally in the east than in the west?—I do not think that it can be more general than it has been in Leicestershire; it has been made a great point of there, but not in Northamptonshire.

3181. With respect to the license, can you give

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give us an idea of the comparative rent of a public-house and of a private house of the same nominal value?—I can. I made it my business to inquire into that subject yesterday. I have some property in the East of London, extending down a street, nearly in the centre of which is an old licensed public-house, the lease of which will fall in in 1869, and I yesterday went into the house to inquire what rent was being paid for it now by my tenant, and I was told the rent was 66 *l.*; I went into the adjoining house, which is occupied by a baker, and the rent of that was 32 *l.* The area covered by the public-house is very little more than the area covered by the bakehouse.

3182. For ordinary purposes, is one as good as the other?—The public-house is a better house; but I should add, that I should let it to a publican upon a repairing lease, and it would be net income to me, while upon the baker's house every year there would be a serious deduction for repairs and insurance, and for the metropolitan rates, which would be paid by the publican in one instance, and by me in the other.

3183. If I were to take that baker's house could I get a license for it?—No, you would have no chance whatever, unless you had very strong private interest.

3184. Have you seen anything of the manufacture of the glucose sugar, now so extensively used in brewing?—I have not absolutely seen the manufacture of it, but I am acquainted with, probably, the largest sugar refiner but one in England, who is now manufacturing it. I am told that there is an increased demand for it, and that that is likely to last. I am told there has been a great improvement in the manufacture of it, and that it is much more in demand for brewing, in the London breweries particularly.

3185. Have you any idea to what extent sugar is used for brewing?—I did not get the figures in the case I have just referred to, but I have no doubt that I could get them, because the principal told me, when I asked him the question, that I might make use of his name.

3186. We were told the other day that some London brewer used half sugar; have you any reason to suppose that to be true?—I believe it to be quite true from what I have heard of the use of glucose sugar.

3187. Do you think that if good beer was cheap there would be more drunkenness?—I do not believe it at all; I believe it would be the reverse.

3188. Can you give us any idea of what sort of beer poor men buy when they do not go to public-houses?—Yes, I can give some evidence on that subject which might be valuable. In Leicestershire, in a very poor village in which I became a proprietor a year or two ago, where there had been a great deal of drunkenness, I was led to build a co-operative store, and having done that, I was exceedingly anxious that they should commence and undertake the sale of beer; and last week I wrote to the secretary and asked him to be good enough to give me an account of all the beer that they had bought and sold last year, and the prices of it, and what they have done in the same way this year during half a year; and I find this, that there has been no increase but a very marked diminution in the sale of the expensive beer, what we may term the intoxicating beer, and a very large increase in the sale of beer at 1 *s.* 1 *d.* a gallon. I have the figures here if the Committee would like to hear them. The co-operative store was started in 1865, and I have taken no account of what they did i the sale of beer in 1865, but in 1866 they bough four qualities of beer; one (the XXX) w at 1 *s.* 6 *d.* a gallon, which they retailed at 2 *s.*, and of which they sold 423½ gallons (I should say that the population of the place is 600, and the manufacture conducted there is hosiery). Of the XX beer they bought and sold 18 gallons; they bought at 1 *s.* 2 *d.*, and sold at 1 *s.* 8 *d.* Of the X beer they bought 492 gallons at 1 *s.* 1 *d.*, and consumed 473½ gallons a 1 *s.* 4 *d.* Of small beer, bought at 2 *d.* a gallon, they consumed 315 gallons at the price (selling i at cent. per cent.) of 4 *d.* In addition to that, they consumed 239 gallons of porter, bought a 1 *s.* 6 *d.* and sold at 2 *s.* Now for this half-year they have varied a little the wholesale price o their beer; the best beer, the XXX beer, they have given 1 *s.* 8 *d.* for, and sold at 2 *s.*, and they have only got rid of 18 gallons in the half-year against 423 gallons in 1866. The next quality o beer, which you may also call strong, they have bought at 1 *s.* 5 *d.* and sold at 2 *s.*, and they have only got rid of 45½ gallons. But of the beer bought at 1 *s.* 1 *d.* and sold at 1 *s.* 4 *d.*, in half a year they have drunk 374 gallons; that is at the rate of about 750 gallons a year; and the greatest draught is to come. The greatest draught upon the beer will be this month, in July and August. They appear to have drunk very much less of the 2 *d.* beer sold at 4 *d.*; they have only drunk 6 gallons in half a year against 315 in the last year and the proportion of porter is very much what i was last year, 100 gallons for half a year. Bu what I wish to call the attention of the Committee to is, that the consumption of what I term the nutritious beer, the ordinary beer they drink at their dinner, is very much increased, while tha of the beer that they make merry with, so t speak, has decreased in a very marked degree.

3189. Have you any reason to believe tha that is good or bad beer which has increased i consumption?—I believe that to be good fai brewer's beer.

3190. From that you would argue that it is no a strong intoxicating beer that the labouring population like?—Distinctly not.

3191. But it is the ordinary class of what yo term nutritious beer?—Yes.

3192. Could you tell us anything about th consumption of beer by men who work at a grea heat?—I think I can say this, that men workin in the very highest temperature consume a ver large amount of beer; and that where the exper ment has been made of substituting coffee fo their use it has failed. I will take sugar-houses. In the very house to which I have already re ferred, the beer bill is 1,200 *l.* a-year, and th average consumption is two gallons a day porter; the men working in a temperature of fro 100 degrees up to 120 degrees. The work is ex ceedingly heavy (it is analogous to the shot drill Shifting the vessels in which the sugar is put t crystallize, and shifting the sugar loaves them selves; and in the summer months, when th sugar-house is still hotter, from the external a mosphere being higher in temperature, it ha been found necessary to substitute beer of a littl better quality than the beer that is usually drunk The average quality of porter drunk in tha house is bought at 18 *s.* a barrel, 6 *d.* a gallon bu

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ht when the hot weather sets in, a little better uality of beer will be given to the men.

3193. Do these men live well?—They live ceedingly well. They are boarded entirely, eir beds and their lodging are found for them by e firm, and there is an allowance of 11 *s.* a-week r board-wages besides the porter.

3194. Do they eat much meat?—They eat eat three times a day, and their meat is beef-eak, and so on. They are Germans, and a great uantity of vegetables is consumed by them, as is e custom of the Germans, I believe.

3195. But notwithstanding that, they have a ood and generous diet; they cannot get on ithout this beer?—They do not appear to be ble to do so. In another large sugar house in ondon, where I have also made the inquiry his all comes in my own district; I did not go here specially with reference to this, but I am cquainted with these establishments), an attempt as been made to substitute coffee for beer, and failed entirely.

3196. Did it cost more or less than the beer? -It cost more than the beer.

3197. Lord *Eustace Cecil.*] Where was this? -In St. George's-in-the-East, in London, near he London Docks.

3198. *Chairman.*] In what way did the coffee il?—It did not get the power out of the en; the men were not so efficient.

3199. The men could not do the work?—The en could not do the work. And I wish to state, n regard to the first sugar-house I referred to, hat in the time of the cholera, when we had in he East of London our people decimated, you ight almost say, there were with them but two ases of cholera; in that sugar-house you could ot trace any bad effects of beer upon the men's ystem.

3200. Mr. *Read.*] You have told us about the onsumption of beer by the agricultural labourers, y the frame-work knitters and these men that work at great heat. Can you give us any infor-mation about the consumption of beer by people ather above the labouring class?—Yes, the class which clerks would come under, and men engaged n the large Manchester houses in London. I know of a house in the City of London where the beer bill is precisely, or as nearly as possible the same amount as the beer bill at the sugar-house I mentioned, namely, 1,200 *l.* a year. I saw the books yesterday; they were opened for me to see what had been paid, and the sum was a nearly as possible 1,200 *l.* for the year's consumption. That house employs 600 men, and feeds them, or professes to feed them, and they are men of the middle class, clerks engaged at the desk, and in supplying their customers, and it is found there, that for the busy seasons, that is to say, the spring trade is coming on; and, again, when the winter trade is coming on, the supply of beer must be increased, and they give a better quality on those occasions. And I put this question to the steward (if I may call him so) of that house, whether he thought it was in obedience to any sort of common prejudice on the part of Englishmen, that they must have beer while they work, or whether the business could be conducted without it. And he said, "Sir, I do not believe our work could be done without it. If you were to come here, it is a perfect pandemonium when this business is going on, with the shouting of orders and re-entries; and the excitement under which the men are working, renders it necessary to give them something besides their meat." And I must tell you, that those who are in that house are boarded in a most liberal way, they have plenty of beef, and tea and butter, and milk at breakfast, and everything they want in the way of food at other meals.

3201. *Chairman.*] What house is this?—I should like to ask their permission to mention their name. I do not know, however, that I need be under any doubt, it is Messrs. Copestake, Moore, & Crampton, in Cheapside.

3202. What are they?—The largest Manchester and Nottingham lacemen, probably, in the world.

3203. Mr. *Read.*] Has the consumption of cheap wines in that establishment displaced the consumption of beer in any way?—No; it has not displaced it, because it is a different class of persons who drink the wines. There is a large amount of light claret drunk in that house, but it is drunk at another table, by the customers who come up to buy at the house. It has not displaced any beer, but it has displaced port and sherry, very considerably.

3204. But these men who do the hard work cannot get on without the beer?—Distinctly not.

3205. From what I gather from your evidence, you would divide beer pretty well into three classes, you would have a strong public house beer which you would call a stimulant, you would have ale, and a better class of table beer, which you would call a luxury, and then what you call nutritious beer, such as is necessary for the agricultural labourers?—Yes, I think that that division might be made fairly.

3206. And the ordinary classes of barley would almost all of them go into the nutritious or common beer, would they not?—I think they would; I think with the malt tax we should get a larger supply of what is needed to make that beer.

3207. Mr. *Arthur Peel.*] I want to ask you a question or two as to the bearing of the malt tax upon the rotation of crops; should you think it a fair statement to say that the malt tax interferes with the rotation of crops, because maltsters only buy the superior sorts of barley and, therefore, farmers do not wish to run the risk of growing the inferior sorts?—I think so.

3208. Have not artificial manures very much interfered with the rotation of crops?—Very much indeed.

3209. And what sorts of land generally grow the inferior barley?—I should say that land which is most highly farmed; heaviest land which is most highly farmed, and with very little grit in it.

3210. But is that land to which artificial manure is being applied?—Very much now.

3211. Is it the fact that the artificial manures very much interfere with the rotation of crops upon the poor soils which produced the inferior barleys?—I think that the artificial manures enable that land to be better cultivated than it was before the introduction of those manures.

3212. Would they enable you to dispense with barley as part of the succession of crops?—No, I do not think so; I find practically, that barley is grown upon the lowest rental land, perhaps, we have; take the land round Newmarket, for instance.

3213. As to the speared wheat and barley, is your only

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only objection to that, that the corn lies about loose, and that it cannot be sacked up, and cannot be readily entered into the farm accounts?—That would be one objection.

3214. What would be any other objection to using that in preference to malt as a condiment for cattle?—I should not use it as a condiment, I should give it as grain. I should not use it as a substitute for malt.

3215. Mr. *Dent.*] On your Leicestershire farm you have never grown barley till this year, you said?—No.

3216. Is it the general custom not to grow barley in that neighbourhood?—I think that there is less barley certainly grown in that part of Leicestershire in proportion upon arable farms than there is in Northamptonshire; but it is chiefly grass.

3217. But you do not take it there as one of your ordinary crops in your ratation?—No; wheat and oats have been my rotation.

3218. Have you heard that farmers object to growing barley, saying that wheat after barley was very subject to night ripening?—I have never heard that remark made; I should not grow wheat after barley immediately, but barley after wheat is very good.

3219. I thought there must be some reason why barley was not grown in that district, and why the rotation was wheat fallow and then oats. I thought probably that there was some special reason?—No; not that I am aware of; my reason is very much that I am afraid of the barley. I farm the land pretty well, and it is at an high elevation above the sea; we have a difficulty in getting the straw stiff, and then the barley becomes, though very bulky, light in quality and of a bad colour.

3220. I suppose that in putting land down in seeds, you have considered the price of corn now?—Yes, sheep were dear and corn was cheap.

3221. And the cost of labour has influenced you?—Yes, the agricultural labourers have been subsidised by the stockingers in my own neighbourhood.

3222.] The laying down of that land at Pinner to grass would be accounted for by its being in the neighbourhood of the metropolis, and a hay crop being valuable in the neighbourhood of the metropolis, I suppose?—No, not in that way, because at Watford, which adjoins Pinner, the land is lighter and grows a very good quality of barley; in fact, barley was never, to my knowledge, grown at Pinner.

3223. Then it is not the effect of the malt tax that barley is not grown there?—No, except in connexion with labour.

3224. How do you account for the fact of the land being laid down at Pinner?—Partly because of its being of the character of London land, very clayey and soapy, and because of the labour getting dear; it was 12*s.* when I lived there, and now I am told that it is 16*s.* a week.

3225. In speaking of the public-houses in London, and the extra rent got for them, I am not to understand you to attribute that to the malt tax, am I?—I do not think that you can attribute that directly to the malt tax; but I think that if the malt tax were removed, you would have struck a very severe blow against the licensing system.

3226. How would you say that the malt tax bore upon the licensing system?—I do not think that the malt tax creates the licensing system, but I think that if we had got rid of one impost, attention would be turned to another immediately, and there would be every effort made to get the sale of beer more free and unfettered than now. I think that that would follow.

3227. Do you mean that you think beer would be very much cheaper?—I think it would.

3228. And better, you would say, I suppose?—And better.

3229. And that, therefore, beer being better and cheaper, the licensing system would go. I do not quite see how that follows?—At present we are dealing with the horse, the other would be the saddle, in proportion; it is a fair comparison. It is also a partial impost; you do not find this licensing system operate throughout the country in the severe way it does in London.

3230. I do not want to get into a discussion on the licensing system at all, but it arose from the question which was put to you as to the higher rents of public-houses; and there was another question which the Chairman put to you, in which he put together the malt tax and the public-house being in the hands of the great brewer. Those do not depend one on the other, do they?—No, I do not say that they do; it is an additional cost to the poor man in obtaining that which I hold to be one of the necessaries of life.

3231. Any public-houses in London and many other large towns, I presume, must be supplied by brewers; they could not have the accommodation to brew on their own premises, could they?—No.

3232. In the London public-houses scarcely any of them could have accommodation to brew for themselves?—None whatever, that I am aware of.

3233. And I think you fairly put it, that it is much more likely that you will get a good and cheap article from a large manufacturer than from a small producer?—I should be inclined to deal with the large manufacturer in preference to the small one.

3234. You would rather buy your beer from a large brewer than a small one?—The character of the two being alike.

3235. Just as you prefer now to buy your beer rather than to brew it?—Yes.

3236. In the co-operative store you have spoken of, the beer is not allowed to be drunk on the premises, I suppose?—No, it is all taken out.

3237. Taken to be consumed in the families, do you think?—A great deal of it is taken to be consumed in a factory which is within 40 yards of the co-operative store.

3238. Do you think that the women and children get any share of the beer going from the stores?—I am sure they do; I made inquiries on that point.

3239. Has the sale of beer there had any effect on the public-houses in that district?—I am told that it has: and certainly the village is much quieter than it was.

3240. Has it had the effect of raising the quality of the beer sold at the public-houses or beerhouses?—I cannot speak to that; there being only 600 in the place I think a consumption, to the extent I have mentioned, must show that that has displaced public-house beer very much.

3241. Mr. Smith told us that he supplies his labourers with the beer, and that the women and children get the benefit of it; that I suppose must go to the cottages; but in the case of your labourers I suppose it goes into the field?—Yes; and if the women are working in the field they get it, but it is not taken into their houses for supper.

3242. With regard to this sugar refiner, I think you said that the gentleman to whom you had applied had no objection to his name being mentioned?—None whatever; I alluded to Messrs. Martineau.

3243. Did you not say that they were large manufacturers of the glucose sugar?—They have commenced it now.

3244. I suppose that they could give this Committee some information on the subject?—I am sure they would.

3245. They employ chiefly Germans?—Yes, chiefly.

3246. Do you know whether the mortality of that class is particularly high?—I have many of them, my own tenants, and I do not find them unhealthy people. I know some very old men among them.

3247. Do you know anything of the ironworks where men are puddling?—Nothing whatever, except merely passing through them, but I have heard that in some instances they have introduced oatmeal and water.

3248. *Chairman.*] With reference to the sugar house, I think I distinctly understood you to say that there was no substitute that the men could take instead of beer?—None whatever, that they have discovered, and it has been tried, not at Messrs. Martineau's but at Messrs. Hall & Boyd's.

3249. In the sugar house, of course, those are what you would call labouring men?—Labouring men.

3250. And in the Manchester warehouse those are a better class of men?—Men receiving from 60 *l.* down to 20 *l.* a year, and their food and lodging.

3251. And there again the beer is indispensible?—They find it so.

3252. Then, is it your opinion that beer is the natural drink of the ordinary Englishman?—Distinctly so.

3253. And that it would be a great deprivation to him to be deprived of that beer?—I think, with reference to the people I have to do with, you must put it in another way; it would be a great blessing to them to get it; you can hardly talk of their being deprived of it, among the agricultural labourers, for, with the exception of harvest and haytime, my men hardly taste it.

3254. Therefore it is your opinion that anything which could produce a cheaper and better beer to the labourer of this country would be a great boon?—I think that it would rank next to the repeal of corn laws in the advantage which it would give to him; I firmly believe that.

3255. There is one question I wish to ask you in regard to what fell from Mr. Peel. As I understand you, the lighter lands are benefited by artificial manure, but the benefit which they receive only improves the class of barley which they grow?—It enables them to grow a greater quantity of it; I do not know whether it improves it, but certainly it enables them to grow it where perhaps they would not grow it at all.

3256. But on the stronger and heavier lands the artificial manure throws down the barley, and therefore you grow a second class of barley upon that land?—I do not think that we can trace it exactly to the artificial manure; the artificial manure that is used during a whole course of cropping tends to enrich the land. But we should not think of giving guano to barley, for instance, but we should give super-phosphate of lime, which does not weaken the corn much, and decidedly increases the bulk.

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3257. But the artificial manure has greater effect upon the barley grown upon heavy land than upon the barley grown upon the lighter land in that respect?—Yes; a sovereign spent upon artificial manure on good land would go much further than a sovereign spent upon artificial manure on bad land; we should expect it to be so.

3258. Sir *E. M. Buller.*] Your public-houses, in fact, any house could obtain a beer license in London, as well as in the country I presume?—You can have an ordinary beer license, because it is a matter of excise and not magisterial for an ordinary pot-house, but they are very rare; I had one upon my property in London, and that did not last above a year.

3259. And you think that the difference between the baker's house and the adjoining public-house arises entirely from the license?—Entirely; there is no doubt of it.

3260. And that license depends upon magistrates?—It depends upon magistrates who lived, perhaps, 100 years ago, or whenever the licensing began; I suppose that these houses that I refer to were licensed at the time when my family first came into the property many years ago, 150 years ago.

3261. Why do you not turn a few more of those houses into public-houses?—If I was to make the application it would not be listened to.

3262. Practically, there is a great objection to increasing the number of public-houses?—They would not listen to it unless it was a new part of London. If I was possessed of ground at Highgate, for instance, and began to build a street there, I have no doubt that I should get a license for one house in the street; but in an old inhabited part of London, like St. George's-in-the-East, I doubt whether it would be possible, unless you rebuilt a street, to get an additional license for a house now.

3263. In fact, they look upon the license as a vested interest?—As a vested interest; and, in fact, the worth of it can be accurately estimated.

3264. To your own knowledge, no new public-houses are opened there?—No, I cannot call one to mind.

3265. To that you distinctly attribute the great difference in the value of the houses?—Yes; I was told by my valuer that, in selling to the North Western Railway Company in the City of London a little property in Broad-street, he had valued the fact of my having a license to a public-house there, that is, the good-will, at the expiration of the lease, at 1,000 *l.* beyond the freehold.

3266. Are the magistrates who grant the licenses many of them brewers?—The general idea is that a brewer cannot be put on the commission, but that is a vulgar error, I fancy.

3267. I am speaking of London?—There must surely be a brewer on the commission in Middlesex; the Hanbury's are, no doubt, on the commission.

3268. But you do not know how many brewers are on the commission in the county of Middlesex?—Not at all.

3269. You have no reason to suppose that it is their particular influence that prevents increasing

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ing the number of public-houses?—No, I should think that they would be above that sort of thing; there would be a general opposition from everybody. I should myself, naturally, if I heard that there was an attempt made to get a license for a house within a short distance of mine, tell my agent to do everything he could to oppose it.

3270. Not on the ground of morality, but on the ground of interfering with your property, you would object to another public-house?—Solely; I do not conceal it.

3271. Mr. *Goschen.*] Would the magistrates admit the opposition on that ground; the ground of depreciating existing property?—Probably I should not state that; I should be as wise as a serpent if I could. They would know perfectly well, however, what actuated me.

3272. The magistrates would nominally decide upon the question whether the license was necessary?—Yes, precisely.

3273. Nevertheless the objections, as made by your agent, would have their weight?—Yes, because there would be so many owners of property circumstanced as myself.

Mr. WILLIAM BIDDELL, called in; and Examined.

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3274. *Chairman.*] I THINK you live at Hawstead Hall, Suffolk?—Yes.

3275. I think you farm about 400 acres?—Yes.

3276. Is that your own land, or rented?—I let my own land; that is rented.

3277. You have land of your own in the county of Suffolk?—Yes.

3278. Is yours a heavy land or light land?—The greater part is heavy land; three-fourths of it, or more.

3279. Do you farm on the four-course system?—Yes; but I vary sometimes.

3280. Do you call yours a barley farm?—No; it is not a good barley farm, it is rather a second-rate barley farm.

3281. But can you grow the best quality of barley?—Only on about two pieces, to a small extent.

3282. Then the barley which you generally grow is of the second class?—Just so.

3283. Is that barley used for malting?—In common years it is not; at least, only a certain portion of it is.

3284. I think you are the chairman of one of the Suffolk associations, are you not?—No; I am the vice chairman of our Chamber of Agriculture, in West Suffolk.

3285. I thought you were the chairman of an Anti-Malt Tax Association?—No; I was an active member of it, but not chairman.

3286. Have you turned your attention much to the malt tax?—Very much.

3287. What effect do you think the malt tax has upon the best qualities of barley?—I think it diminishes the price of the best qualities. If it were repealed, I think there would be nearly as much money spent in beer as there now is. If that was so, that same money would want a great deal more barley to produce the beer.

3288. I do not quite understand what you mean by that; do you mean to say that if the malt tax were repealed, there would be a greater quantity of beer brewed from malt and hops?—There would be a greater quantity of beer consumed, and consequently brewed, because there would be a greater quantity of money to buy it with. If the tax were repealed, I imagine that the consumers would gain, we will say, ten millions; and if three-fourths of that ten millions were still spent in beer, we should want an enormous quantity more barley to manufacture that beer from.

3289. But is it your opinion that if the malt tax were repealed, the brewers would use more malt and hops, and not the other substitutes now used?—Most decidedly.

3290. We have had it in evidence that the best barley would be increased by 5*s.* a quarter; is it your opinion that that would be about the difference that would be made by the repeal of the malt tax?—Not so much as that, but something considerable.

3291. Do you find a great difficulty in selling your inferior barley?—In some years I do.

3292. Do you find that the maltsters are not very good buyers of that class of barley?—They do not care about it; we cannot sell our heavy land barley to the maltsters some years at all.

3293. What should you say was the difference in price, taking ordinary years. Supposing, for instance, the first class barley were worth 40*s.*, what should you say would be the value of the second class barley at the present time?—Well, I do not often get 40*s.*; but supposing I sell my best class barley at 35*s.* to go to the maltsters, the merit of that is represented by 17½ gallons of beer from the bushel; then if my secondary barley will produce only 14 gallons to the bushel, if the malt tax did not exist, I should get 28*s.* a quarter for that barley, being the proportionate merit of it with my best.

3294. But what I want to know is this, supposing the relative values now are as 30*s.* to 40*s.*, how much would the repeal of the malt tax increase the value of the second class barley?—I think the malt tax depreciates the secondary barley to the extent of 4*s.* a quarter; but if I allowed for the increased consumption following the repeal of the malt tax, I believe it would be more.

3295. I think you were going to give a view of that of your own which you have elaborated?—Yes; I assume that a quarter of the best barley will produce 17½ gallons of beer to the bushel; that barley I take to be worth 35*s.* a quarter. Then if I farm highly, and get an inferior barley which will produce only 14 gallons to the bushel (that is one-fifth less); proportionately that ought to sell at 28*s.* a quarter, the difference being as 14 to 17½, but the maltster will not give me more than 24*s.* or 23*s.* for it, because when he has added the same amount of malt tax on each, he must have a fifth difference. If he adds the malt tax to the best barley, that will bring it up to 57*s.* a quarter, that is to say, 35*s.* added to 22*s.* duty in round numbers. The secondary barley with the malt tax, and first price, must cost one-fifth less; that will leave it 45*s.* 8*d.*, which it must cost the malster, taking both duty and first price. Then, if I take the duty, 22*s.*, from that 45*s.* 8*d.*, that leaves only 23*s.* 8*d.* for my barley; and yet if that were sold according to its merit, it would fetch 28*s.*; it was worth one-fifth less than the best, that is to say, 35*s.* less 7*s.*

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herefore I say that the malt tax depreciates my cond barley, by all the difference between 28 *s.* nd 23 *s.* 8 *d.*

3296. Then your opinion is that it does dereciate your second class barley?—Most conderably and undeniably, and affects our farming y so doing. I have worked it out on paper ere, showing a case where a smaller quantity of allons of beer grown per acre (the barley is ıeasured by the gallons of beer which it prouces) pays me better than a larger quantity of allons grown per acre.

3297. With regard to the rotation of crops; o you think that the malt tax interferes vith the proper rotation of crops?—It does coniderably, I think, on strong land. Where I am gent (I am a land agent), tenants come to me nd say, "That field does not grow barley well, nay I grow wheat on it?"

3298. You are a land-agent as well as a farmer ou say?—Yes.

3299. Do you look after many estates?—Eight housand or 10,000 acres belonging to six or eight eople.

3300. And you let, I dare say, a great variety f land?—Yes, from 2 *s.* 6 *d.* an acre up to 45 *s.* n acre.

3301. And you find that not only on your own estates, but also on the land which you look after, the malt-tax interferes with the proper rotation of crops?—Yes.

3302. Do you find that spring wheat is substituted for barley?—No, we rarely grow spring wheat.

3303. What do you substitute for barley, then? —Wheat, which we put in before Christmas.

3304. Do you grow oats?—Not to a great extent.

3305. Do you find that growing wheat instead of barley is detrimental to the land, particularly growing it at the time of the year that you have mentioned?—I think that it would be better for the land to have barley alternately, instead of wheat every other year.

3306. Do you think that if the malt tax were repealed more barley would be grown;—Most decidedly; but I do not think that it interferes so much with the rotation of crops as in the quantity grown per acre on such land as mine; I should farm higher if the secondary qualities of barley sold better; the result of high farming being to obtain a second-rate quality, or a third-rate quality on my farm.

3307. Then, as I understand you, the malt tax prevents your farming as high as you would otherwise do with reference to the barley crop? —Yes, decidedly; if I get it too heavy I lose the quality, and it comes to less money than a lighter crop would per acre.

3308. Do you know anything of the Act passed some time ago, called Mr. Gladstone's "Malt by Weight Act"?—Yes.

3309. Do you think that that Act has been of any benefit with reference to the lighter classes of barley?—It was a year or two back; they worked on it in our county; but, I believe, that this present year they have been doing little or nothing under it.

3310. Do you know whether the foreign barleys benefit by that measure?—Mr. Gladstone, I remember, anticipated in his speech, that it would be the foreign barley which would be benefitted by it, and, perhaps, it has been.

3311. You know very little about the working of that Act yourself?—No; but I have been told by the maltsters, that they found it not worth their while to work under it.

3312. There was another Act passed, introduced by Mr. Gladstone, the "Malt for Feeding Cattle Act," have you any experience of that?— I have used some of the stuff.

3313. What do you think of it?—They got the price too high, and the conditions which the maltster told me the Government attached to carrying the thing on under that Act were so troublesome, that they would not do it unless they got a good profit.

3314. We have had it in evidence, that it failed because the malt and the linseed had to be ground so very small?—So it had, for out-door feeding, where the wind could blow it about, but I applied it to bullocks inside a shed.

3315. Did you find it as objectionable inside a shed?—No; that objection was more felt when they used it outside for the sheep.

3316. Still we have had it said, that it was ground too small for feeding purposes indoors?— It was much lighter than any other meal we used.

3317. Did you use any speared barley at any time?—Yes, when we had barley so cheap, I speared a good deal.

3318. Did you find it of great use for feeding purposes?—I thought that it answered. I gave it to my cart-horses.

3319. Did you feed any bullocks with it?— No, it will not keep; that is the difficulty; you must use it at once.

3320. Do you know that the Excise has interfered, and that that has been prevented through the country?—Not to my own knowledge; I never consulted the Excise about it.

3321. Have you ever tried malt alone as food for cattle?—No; but I have a brother that has.

3322. Does he live in your neighbourhood—? In the same county, Suffolk, but in the other part of it.

3323. Have you seen some of his cattle fed upon malt?—I have seen some of his sheep. I do not think that he tried it on cattle, but on pigs and sheep.

3324. Do you know whether it succeeded on pigs and sheep?—One of his pigs died, and that spoilt the experiment for pigs; but with his sheep it was very successful. I cannot give you the figures, but I well remember that they came out remarkably well upon the sheep.

3325. Have you ever seen the report of the experiments undertaken by order of the Board of Trade by Mr. Lawes?—Yes.

3326. Have you carefully looked at that report?—I read it through, but I cannot say that I am anything like master of it.

3327. You are not able, perhaps, to pass an opinion whether those were fair experiments or not?—In some of the experiments he made, I thought he gave very small quantities to the animals, too small to do any good.

3328. Do you agree with him when he says that barley is decidedly better for feeding purposes than malt?—No, I do not. I think that one of his mistakes was in malting the barley too much; if we could have it malted to a much less degree than he did, I think that we should have a very different result. A friend of mine had some malt analysed, and in the different stages of malting, he found that the analysis was very different;

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different; and I think that Mr. Lawes failed in malting it too far.

3329. You would then rather feed with malt than barley?—I do not think that either of them would do alone; partially malted barley, I think, would do best.

3330. Do you brew for your people at haying and harvest?—Not as a matter of wages. I give them a good deal, but they buy malt in harvest.

3331. Then do they brew for themselves?—Yes.

3332. Whom do they buy their malt of?—They get it through me; I can buy it cheaper than they can. They generally come to me just before this time, 10 days before, and say, "Will you buy us some malt?" They did so this year, and I said, "Yes, if you like;" and I bought them some. Then they pay me at the end of the harvest for that; whatever it costs me, they pay me.

3333. Then, as a general rule, during the haying and harvest, your labourers buy malt and brew for themselves?—Yes; at harvest more especially, and generally speaking my horseman, and bailiff, and shepherd at other times keep a little beer in the houses, which the others cannot afford to do.

3334. Then it is not the custom in your part of the country either to give beer, or malt, or money instead of beer or malt?—We give money instead.

3335. I thought you said that you did not find them either money or malt?—They do what they like with their money, being paid by the acre.

3336. I want to ask you whether you gave them money instead of beer?—I give them money, and we say nothing about beer. We give so much an acre, and say nothing about beer or malt. Then they come to me and say, "Will you buy us some malt?" And then they pay me when we settle up the harvest.

3337. You give your labourers a certain price per acre, as I understand you, and give neither beer or malt?—Yes.

3338. But your people buy malt and brew at home at haying and harvest?—Yes; nine out of ten drink their own home-brewed beer.

3339. At other times do these men go to the public-house or drink their own beer?—They have to go the public-house, the common paid ones; but my horseman, and shepherd, and bailiff brew themselves at other times.

3340. Supposing that the malt-tax were repealed, do you think that it would be the general custom of labourers in your part of the country to brew at home?—I have no doubt of it; it is the continual custom, which they adopt in harvest.

3341. Then it is your decided opinion, that if the malt-tax were taken off, it would be a very great advantage to the labouring man?—I have no doubt of it.

3342. Is the public-house beer in your neighbourhood very bad?—It is not good.

3343. Do you think that it has an injurious effect upon the health of the labourers?—I have no doubt that it has.

3344. And do you think that if the tax were repealed, they then would have a very much better class of beer than they now get?—I have not the slightest doubt of it.

3345. You know that the malt-tax produces now something like 6,400,000 *l.* to the revenue?—Yes.

3346. Have you turned your attention to any substitute for the malt tax?—Only a beer tax. I believe that if they get the money out of beer they had better get it direct rather than through the malt.

3347. How would you deal with the private brewer?—I should make him give notice when he was going to brew, and state the quantity, and I would tax him by the bushel, not measure the quantity of beer.

3348. You think that there would be no objection to taxing the private brewer?—No; I think not; the farmers in our county, I think, would submit to that.

3349. You think that on the whole a duty in some shape on beer would be far preferable to the duty on malt?—Most decidedly.

3350. And you think that if the duty were placed on beer it would be a great gain both to the farmers and to the labourers?—Yes; I think that the money would amount to less if the tax were put on beer. It accumulates now by being placed in the first instance on the malt; there is a profit or two to be paid on it, and the maltster has, from the interest of his money, to make good bad debts, and so on.

3351. I may gather from your evidence, then, that you think the repeal of the malt tax would be a great advantage?—A very great advantage. There is one point I should like to notice, and that is how the malt tax practically prevents farmers taking care of a surplus in an abundant year and laying it up for the next. I mean that if the Almighty sends us a bountiful harvest of barley this year, and I do not like the price I get for it, I cannot lay it up.

3352. Why cannot you lay it up?—Because barley will not keep without heavy depreciation. Three years back I had an idea to keep my barley over; I was discontented with the price at that time, and I went round to my best buyers at Bury St. Edmunds and said, "Will you buy my barley if I keep it till next year?" and their answer was, "No, not if we know it to be old barley." It depreciates the price. If I had paid a person 2 *s.* or 4 *s.* a quarter to malt it, it would have kept as malt; but now, in a pecuniary point of view, that is practically prevented. I must not only be deprived of the money which this barley would bring in, but I must pay the Government 22 *s.* a quarter if I want to lay up any quantity of malt. I must have double the capital. Still the Government might let me put it in bond; they never have done so, but I do not see why they should not.

3353. Sir *E. M. Buller.*] Does barley depreciate as much if kept in the stack?—The gentlemen I put the question to (I put it pointedly), "If I did not thrash my barley would you buy it next year?" said "No."

3354. There was only one instance, so far as you know, where there was that prejudice?—I believe it is not prejudice, but that the barley will not malt kindly the second year.

3355. But if you could turn it into malt it would keep then an indefinite time without taking any damage, you think?—I believe so; in a dry place we keep our wheat; but we never find any farmers to keep the barley.

3356. Major *Parker.*] Is cottage brewing general in Suffolk?—Yes, decidedly.

3357. Will you state to the Committee what you consider generally to be the advantage gained by the labourer by brewing at home?—I think that

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at he gets a genuine article, and I think that gets it at least 25 per cent. cheaper.

3358. Do cottagers bake as a rule?—Yes, as a le they do.

3359. Do you think it an additional advantage them to have the benefit of the yeast derivable om their brewing?—Decidedly; they are put great difficulty to get yeast in our part very ten.

3360. Do the labourers experience any diffi-ulty in getting the plant, that is to say, the pper, and so on, necessary for brewing?—They e very accommodating to one another in that spect, and I know some masters that lend a w of them together their brewhouse to brew ; and then the cottagers themselves find the ttle tubs to put it in.

3361. Now, about the firing used in brewing? -We give them a lot of firing, wood, and so on; metimes they have to buy it, but even then ey brew.

3362. Mr. *Henry Surtees.*] Do you brew at our farm?—Yes.

3363. Do you know what it costs you per allon to brew?—About 1 *d.* a pint; about 8 *d.* gallon; that is, taking best and mild together.

3364. You mix them together, do you?—No; mean, if I take the average, if I brew so much est and so much mild (which we do); then, if I ut them together and measure them, that costs *d.* a gallon.

3365. Half of that being mild?—Half mild nd half what we call best; the mild beer is a ery pleasant genuine article.

3366. And would the cottagers and labourers e able to brew beer at about the same cost as ou, or cheaper?—Not cheaper, I think; but I hink that they brew at the same cost; their wives brew chiefly, so that the men themselves o not lose time in brewing.

3367. Mr. *Arthur Peel.*] What is the value of barley as entering into the succession of the rotation of crops; if there were no artificial manures, what would be the chemical value of the barley?—I cannot tell you the chemical value.

3368. Would it be of more value than other crops which enter into the rotation?—Yes, it would sometimes; but it is all a question of price.

3369. Quite apart from the question of price, would it be of more value for the land?—It would be better for the land than having wheat too often, to have barley at times.

3370. But will not the application of artificial manure make you independent of the rotation of crops?—No; I think not.

3371. Could you not force your land to grow anything by means of artificial manure?—No; decidedly not.

3372. You might have a larger outlay in artificial manure, but you would get a larger return?—You may go to any outlay sometimes, and if the land has got foul, out of condition for some particular crop, I do not think that any outlay would put it in condition.

3373. If it was not worth while to grow barley, might you not grow some other crop under the stimulus of artificial manure?—Yes; I think we might.

3374. And get a larger return?—No; I think not a larger return.

3375. Mr. *Dent.*] Mr. Pell, in his evidence, told us that he bought beer for his labourers at 9 *d.* a gallon; you say that you brew yours at about 8 *d.*, taking the two kinds together?—Yes.

3376. Are you including your own beer that you drink at home?—Yes.

3377. You do not agree with him, then, that beer can be brewed at less cost by the brewer than by a private individual?—I can brew beer far preferable to what I buy, at a less cost.

3378. In saying that, do you take into your consideration all the cost connected with your brewing; your plant, your fuel, all and everything connected with it?—I never had much expense in the interest on plant.

3379. You must take that into consideration, however?—It would come only to about 3 *s.* a year; I should consider that I brew 25 per cent. cheaper, even if I were to allow any reasonable sum for my plant; my plant is not worth much.

3380. In the eastern counties you think that the practice of brewing at home is still prevalent, and not decreasing?—No, I do not think it is, at least not in parts of the eastern counties. Some parts they do not brew in, so I have understood.

3381. In your neighbourhood the custom of farmers and other people brewing at home is not going out?—I do not think it is increasing. I hear of people that buy beer now who used to brew it.

3382. I suppose if you hear of people buying now who used not to buy, that is a decrease in the custom of brewing at home?—It would be, but it may be made up in another way; there may be other parties brewing now who did not formerly.

3383. Mr. *Goschen.*] What would your labourers pay in your neighbourhood for that beer which you can brew at 8 *d.* a gallon?—They would have to pay 2 *d.* a pint for beer not better than that.

3384. They give 2 *d.* a pint for that which you are able to produce at 1 *d.* a pint?—I consider that my beer at 1 *d.* is as good as that at 2 *d.*

3385. Do the labourers brew as cheaply as you brew?—I should think they did.

3386. Therefore, they can produce their beer at half price as compared with what they buy it at?—Yes, if they buy it at a pint a time.

3387. That is the usual way in which they do buy it, I suppose?—No; some of my labourers have very inferior beer, and then they buy it nine gallons at a time.

3388. Then they get it cheaper by buying that quantity?—Yes.

3389. But are those the same labourers who can afford to invest in that quantity who cannot afford to buy the malt?—Just so; sometimes the best of them buy malt, and only buy beer if they are hard up.

3390. These same labourers, if able to afford to lay in a stock of nine gallons of beer, would be able to afford to buy malt to brew themselves?—No, because they buy a very inferior beer when they buy nine gallons at a time. They buy it at, I might say, the laughable price of 2 *d.* a gallon; now, to brew sensibly, they must buy a bushel of malt, and that will cost 8 *s.*

3391. They buy some beer at 2 *d.* a gallon, you say?—You would hardly call it beer, but they buy something they call beer.

3392. They prefer to buy that stuff, because it is so extraordinarily cheap, to brewing the usual quality of beer, for which they have to pay 2 *d.* a pint?—They buy that when their pockets will not allow them to drink the better sort.

3393. Is

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3393. Is it not rather the exception than the rule for them to buy that beer at 2 *d.* a gallon?—Generally speaking, they would give 2 *d.* a pint, and up to 3 *d.*

3394. When they brew for themselves, is it beer of that quality?—They brew two kinds, the same as I do; their best is as good as that, but their second not so good as that.

3395. Excepting when they buy that horrible stuff at 2 *d.* a gallon, would you say that they have to pay almost double for the beer to what they would have to pay if they brewed for themselves?—If they buy a pint at a time.

3396. Or even if they were to buy a quart at a time?—It would hardly make any difference.

3397. Therefore, they would at the public house; is it twice as much as they could brew for themselves?—I am of that opinion.

3398. Nevertheless, they do not brew very much for themselves on account of the malt?—They invariably brew at harvest time, because their wages will then allow of their getting the articles.

3399. Do the agricultural labourers invest much in the savings bank in your neighbourhood?—It is a delicate question which I never like to ask them. I believe that some of my men do.

3400. Because if they have money to put in the savings bank it would be an immense saving if they were to brew their own beer?—They act upon the impression that if they once get it out of the savings bank it would never go back; they do not work their banking account as you and I do.

3401. But if they have wages over, if they can afford to put any money at all into the savings bank, they would be able to afford to buy the malt in advance?—I do not think that more than a couple of my people have any money in the savings bank. It is a delicate question, however, to ask them.

3402. Do you think it is the fact that they are hindered from brewing because they cannot afford to spend 8 *s.* on malt?—Just so, by the first cost of a bushel of malt.

3403. But of that 8 *s.* for the malt, how much is represented by the duty?—I should say over 3 *s.*

3404. The fact is, that it is the outlay of that 3 *s.* a bushel on the malt which stops them from buying the malt, though, if they did buy it, they would get their beer 50 per cent. cheaper; is that so?—Yes, I think it stops many, because those men who only get about 2 *s.* a week more, my horseman, bailiff, and shepherd, brew at other times besides harvest. I think that taking the duty off would make the difference between the other men being able to accomplish it, and not being able to accomplish it.

3405. It may be stated in this way, they have to put about 3 *s.* into beer which they would save in the end in the drinking of the beer over a certain period; but because they have to pay that so much earlier to buy the malt, that is to say, to pay the malt duty, therefore they are prevented from brewing?—I think that if they could start with a bushel of malt at 4 *s.*, they would, many of them, brew; and, moreover, a good deal of our inferior barley would then be malted, and they would buy some of the inferior barley in the shape of malt.

3406. They are prevented by the 3 *s.* from effecting that ultimate saving, you think?—It might amount to more than 3 *s.* They would then not be particular as to what class of malt they bought.

3407. Supposing that there were a beer duty how do you think that that beer duty would be levied; what would you suggest?—I would suggest that the maltsters be still under a little oversight by Government. I would make them render weekly returns of their deliveries, and I would make every person who brewed give notice that he was going to brew it. Those who brewed small quantities I should not assess as I should the great brewers on the gallon, but make them pay so much a bushel at once.

3408. Do you mean the agricultural labourer?—No, I am referring to the farmers; but those people who brewed only a bushel at a time I would not tax at all.

3409. Would you limit it by quantity?—Yes; if they were people and lived, say, in a 4 *l.* house, and brewed only a bushel at a time, and did not sell it, I would not tax them at all.

3410. How would you be able to know that they did not brew more than a bushel a time?—They should give notice, the same as other parties.

3411. Labourers should give in a return, saying, "I am going to brew, and only going to brew, a bushel"?—Yes.

3412. And would you leave that entirely to the conscience of the parties who are going to brew?—The Excise would have a check upon them by knowing where they bought the malt by the returns which I should make the maltster give; that would be a check upon them; and the hop sellers would act in the same way by giving weekly returns of their deliveries.

3413. But if you took the duty off the maltster entirely, and put the duty on the brewer, how could the maltster know the quantities used by these persons?—I think he could.

3414. You would have the exciseman to visit every brewing establishment, however small it might be?—What are we doing now in regard to sugar? I was at a farm the other day, and the man told me that his labourers had begun to brew sugar to some extent. You have no surveillance now on that.

3415. You are aware that it is not legal to brew anything except sugar and exciseable articles; I mean, that you may not use any substitutes?—If it was possible to brew on dried corn I suppose you might. I did not know that it was illegal. I knew it was illegal to brew sugar.

3416. No, it is not illegal to brew sugar, because sugar is taxed to bring it up to the tax upon malt?—I mean that it is illegal to brew it without paying the extra tax.

3417. But you mean that the private brewer do brew without that tax?—I mean that labourers begin to brew with sugar, and do not pay the tax; and I have reason to believe that other private brewers do the same now.

3418. Then, I suppose that if sugar were to be used largely instead of malt for brewing, it would not be so necessary to repeal the malt tax?—I think it would be more necessary.

3419. Why, for whose sake?—Our barley would be superseded by a foreign production, and that would injure the home producer.

3420. By "our barley" you mean the farmers?—Yes.

3421. But I thought you put the malt tax rather as a grievance on the agricultural labourer than

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an on the farmer?—I think it is a general evil, hink it would be to the benefit of the nation at rge to have it repealed.

3422. But the farmer as the producer of barley ould be injured, according to your view, by the port of foreign barley?—Yes.

3423. Would you be in favour, for the sake of eapening beer, of repealing duties upon any her articles except barley; you admit that one the chief reasons for repealing the malt tax ould be to make it possible for the labourers to ew their own beer, but you can do that by her means besides the repeal of the malt tax?—es, but I think we should get a double advange as producers. The repeal of the malt tax ould stimulate the production of barley, as, for stance, if we took the tax off sugar it would imulate the production of the Jamaica men; d I think that the home producer ought to come st.

3424. You are aware that there is a duty put foreign malt?—Yes.

3425. And that that duty is so high that reign malt cannot be brought in?—That is ry little higher than ours, if you take into acunt the advantage it has.

3426. Still as a fact there is scarcely any imrtation of foreign malt at all?—Very little ineed.

3427. Would not that rather prove that the ty on foreign malt has been pitched a little to gh?—Not as comparing it with our duty.

3428. It is higher as a matter of fact?—Yes, is higher as a matter of fact, but very little ore than is made up by the advantages which ey enjoy.

3429. Still that little more has had the effect f keeping you free from the competition of reign malt?—No, I do not think that the 4 *s.* er quarter extra duty has been the sole reason. Ve could beat them I believe apart from that.

3430. You would not be afraid, then, as you ould beat them if that duty on foreign malt ere put lower; you do not look upon it as rotective duty?—No, I do not look upon it as protective duty.

3431. So that that duty might fairly be reuced?—Not unless you reduced ours.

3432. You said, I thought, just now, that it vas a little too high?—No; I said that it was a ittle higher than ours, but only proportionately or very little more than that) to the advantages vhich they have got.

3433. It is that "very little more" that I nean?—You may take that at a shilling; I, as farmer, do not care much about it.

3434. But you can beat them by the home roduction, though you say they enjoy advanages?—We now have their barley, and if they ike to send it as malt, it would have no great ffect on our market; I do not see why it should. We malt it here, a great deal of it, when it omes, and there would not be more malt made, I think, from foreign barley.

3435. What is the quality of foreign barley for malting; is the foreign barley as much adapted for malting as the English barley?—I elieve not; I am no maltster.

3436. But you have understood that it is not?—I have understood that it is not so well adapted as our better barleys, but it is better adapted than our worst.

3437. As far as the consumption of beer is concerned, of course the agricultural population stands on the same footing as all the remainder of the country, in being interested that the beer should be produced as cheap as possible; but what would you state are the chief grievances of the agricultural population besides their grievance as consumers of beer?—I say that beer to the labouring class is the "sovereign good" itself; and if we can get them the comforts of life (of which they think beer one of the chief), we shall keep them here. Our men emigrate because they cannot obtain the comforts of life at home.

3438. Are you aware that the consumption of beer is greater in this country than in any other?—I think it is; but our labourers do not drink wine.

3439. Therefore, if you take the consumption of beer alone, you think that that is no fair criterion?—Here the out-door labourers get nothing but that beverage to drink in the fields; but in other countries, France, for instance, I believe they drink low-priced wines in the fields.

3440. Are you aware that in Bavaria, which is the greatest beer country abroad, the consumption of beer per head is even less than here, though that is the great country for it?—I am not aware of that; but I suppose that in that part of Germany they get low-priced wines also.

3441. You think that by the reduction of the malt tax, even if a beer duty were put on, you could stimulate the consumption of beer considerably?—Yes.

3442. Considering the position of the labourer, you say that it is a great inducement to retain him in the country if you can supply him cheaper with the necessaries of life; but if you can find any other tax that weighs upon him equally with that upon beer in the shape of the malt tax——?—There is none.

3443. If there were; if, for instance, the tax upon tea and sugar weighed as heavily upon the labourer generally as the malt duty, you would be willing that the taxes should be put side by side and compared, to see which was the heaviest?—No; I say that the labourer, however much he stimulates the consumption of tea and sugar, gets no benefit from doing so; whereas if he stimulates the production of one of his own articles of produce, viz., barley, that does him more good.

3444. That would hold good of the agricultural labourer who grows barley, but would not hold good of the whole of the working classes of the country?—I think it would, because the home trade is the best which, by the prosperity of the agricultural labourers, is promoted.

3445. But barley is not a production of a very large proportion of the working classes of the country?—Indirectly it is; indirectly there is a very large proportion of the working classes living out of agriculture, that is to say, engaged in producing food.

3446. But this is only one kind of food?—But this is one of the staple productions.

3447. And that is the argument, or one of the arguments, for repealing the duty on malt rather than any other duty which may also weigh upon the labouring classes?—That is one of my arguments.

3448. On the whole, do you think that the argument is stronger on account of the consumers of beer, or on account of the rotation of crops, and those difficulties which affect the farmer especially. To which do you attach the greater importance?

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importance?—It is rather a difficult question to say which is to have the greatest weight, this argument or that.

3449. I will put it in this way then: if you could be convinced that another tax would aid the agricultural labourer, as much as the repeal of the malt tax, would you still be in favour of the repeal of the malt tax, on account of its interference with the rotation of crops?—Decidedly.

3450. That would still be an argument sufficient to counterbalance any other, weighing the claims of the different taxes which affect the working classes?—Yes; I put it more especially on high farming. I think that where it has injured us more than anywhere else is in the high farming, for producing an inferior quality; you depreciate that inferior quality 10 per cent., or more, by the malt tax.

3451. And you do not think that you can get over that at all, by measuring by weight, according to Mr. Gladstone's Act?—No; I give Mr. Gladstone credit for his idea, but weight is not a safe criterion of merit in barley. I had an extremely heavy sample the year before last; I sent it to Bass & Co., but no, they would not have it; it was too steely.

3452. Is weight no criterion?—Yes, it is a criterion; but on the other hand you have heavy barleys that the brewers do not like; it is a criterion, but not an exact one.

3453. There are others that overweigh it; there may be other features in the barley which may make it a false criterion occasionally, you think?—Yes; there are barleys weighing 52 lbs. to the bushel, better for the malster (at least he would prefer them) than some weighing 55 lbs.

3454. As far as it goes, the Act is a step in the right direction?—As I told Mr. Gladstone once, it is just like an inch to a yard, but the scheme would not do; if he could find out a scheme whereby to tax secondary barleys proportionately to the best, that would be good, but the present scheme will not and does not answer.

3455. You consider that it has failed?—I am told that the maltsters, those who tried it the year before last, liked it; it was a dry year, this last year, it was of no avail to them, so I am told, but I am no maltster.

3456. Mr. *Lefevre.*] Do you find that your labouring men add any sugar to their beer?—I never knew them do so, but the gentleman living in the country told me that his labourers did.

3457. Do the farmers use sugar for brewing? —They may, but they might not tell me of it if they did; but I think that I could point to a place where sugar is used, and which the Government know nothing about.

3458. Have you reason to believe that that is the case?—Yes.

3459. Have you reason to believe that the farmers about you do use sugar?—I think that there are places where brewing of sugar is going on which the excisemen know nothing of; it is impossible for them to detect it unless they have the strictest surveillance; for instance, I know a little shop where they have at one end of the house a place to sell groceries, sugar, tea, and so on; and at the other end they brew.

3460. Do they sell that beer?—Yes, there are lots of public-houses where there is a shop attached in that way.

3461. Do the labouring men add any hops to their beer?—Yes.

3462. You think that they would brew all the year round if the malt tax were taken off?—I will not say all the year round; they would brew to a much greater extent than they do now. I should not like to say that men when they were hard up in winter would be brewing, but in haying time and nearly all the summer, they would be brewing. They would brew from inferior malt, I have no doubt; such malt as we should then make. I mean that which would be made out of our inferior barleys, and which would cost much less than the present price of malt. If the present price of malt is 8 *s.* or 9 *s.* a bushel, I think that they would get very likely malt from that inferior barley at 4 *s.* then.

3463. I understand you to say that if a beer tax were substituted for the malt duty, it would be necessary to exempt the labouring man?—I did not say necessary. I thought it would be desirable.

3464. On the ground that it would not be possible to levy the tax?—No; on the ground that I think that it has become our policy to let them get the comforts of life as easy as possible.

3465. If brewing by labouring men became general it would amount to a relief of the malt tax to a certain extent, would it not?—As far as the labouring men in the country are concerned, still your town-men drink more than our countrymen.

3466. But the consumption by the agricultural labourers must be very large?—Yes; it is chiefly by the young single men.

3467. The effect of substituting a beer tax for the malt tax, and giving an exemption to labouring men, would, in fact, be to act as an encouragement to labouring men to brew at home? —Decidedly; I do not say that it would be necessary to exempt them, but that I should like to see them exempted.

3468. I think you stated that if you levied the beer tax upon the labouring men they would be under the same difficulties as they are now under, of providing the money for the malt tax. I think you said that providing the money for the malt tax disables them from brewing the greater portion of the year?—Yes, but to bring in the same revenue, I think that the beer tax would amount to much less per bushel than the present tax.

3469. But if the beer tax were levied on labouring men they would still be able to brew all the year round?—I think that if they were to put a low tax on beer, looking at the enormous increase that has taken place in the sale of tea, and so on, we might look for a similar increase in the sale of beer, and yet get the same amount of revenue.

3470. Have you estimated the cost of collection of such a tax?—As I said before, I think we have got to that time when we must have a strict surveillance of breweries and you might do away with the surveillance of malsters. With this sugar business there must be a close looking into breweries, and, I think, that some close looking into them would go a long way towards seeing after people; but, if the malsters gave a return of their deliveries every week, I think that that would be a check to anything like fraud on the part of the labourers.

3471. Mr. *Stephen Cave.*] You want to get rid of the excisemen out of the malt houses, do not you?—Well, nobody ever liked the excisemen.

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3472. Is not that one of the arguments in fvour of repealing the malt tax?—Yes; I belve many maltsters say that it interferes with teir process very much; that they must manage a their barleys pretty well alike; they are etty well bound to one course under our esent excise, I believe.

3473. If you levied the duty by means of a rurn issued by maltsters you would fall into tat difficulty again, would you not?—No; I tink that they would have no interest to deny te fact that they issued so many bushels of malt such and such people.

3474. But if you paid a duty upon malt you uld be a less good customer to the maltster than i you paid more?—Decidedly.

3475. So that it would be the interest of the iltster not to make a proper return?—I do not tink that they would be so dishonest; they ould not be knaves to benefit another man.

3476. No, but the less duty there was paid, e more customers they would get for that malt? -I do not think that that would make an appeciable difference in their making proper turns or not. Our malting has now got into rge hands; there are hundreds and hundreds malting in our county that have been superseded late years; nearly every parish had its malting use 50 years back.

3477. The maltster, I suppose, would sell to a tail dealer, would he not; not directly to the bourer?—In country places he would sell direct the labourer; but I would make the maltster ake a return, and the hop-seller too.

3478. Who would pay the duty eventually?—he man who brewed it.

3479. The labourer?—Yes, if you levied the x on the lower class.

3480. The exciseman, or some one, would have go round to every cottage to collect it?—No; ut I would compel every man to give notice hen he was going to brew.

3481. But would it not be very difficult with e uneducated labouring class to make them give otice every time they had a bushel of malt to rew?—It might be left at the malting house, nd you might require the maltster to post it.

3482. Where would the duty be paid by the abourer?—He might send his wife to any reaonable distance with it.

3483. There is great difficulty, I mean, in obaining all these small taxes; they seldom pay or collection?—Still, I think that we are coming o a time when there must be a reorganisation of overnment in that respect.

3484. Is not the tendency to do away with umbers and to centralise?—I should centralise n that way; I should put all local affairs into he hands of district men, who should take charge f all these things, all rate and tax collection, ssessment business, and so on.

3485. You know the difficulty of collecting rates from small cottages?—Yes.

3486. And you think that there would not be that difficulty in collecting a tax on a bushel of malt?—No; if you wished, you could make the labourer pay a slight duty when he took it from the maltster.

3487. What is the smallest quantity which you can brew?—I have heard of people brewing a peck; I saw them once brewing less than two pecks.

3488. How much beer would that make?—"Beer" is an indefinite term.

3489. Of the sort usually drunk, how much would it make?—About five gallons to the peck.

3490. That is about the smallest quantity that anybody could brew, is it?—I believe I have once heard (I do not vouch for the accuracy of it) of a man brewing a quart of malt.

3491. You think five gallons the smallest quantity ordinarily brewed?—Yes.

3492. Has every cottager convenience to brew five gallons?—Every one; they are very accommodating to one another.

3493. I think you mentioned some farmer who had a large copper, and allowed two or three of them to brew together?—Yes; six or seven put their malt together in a great copper belonging to one of my neighbours and brewed; but my men, I believe, all have conveniences of their own.

3494. If you excused the labourers the tax it would knock up the public-houses altogether, would it not?—I believe it would injure the public-houses.

3495. Would it not be rather a just complaint of the keeper of the public-house that you taxed him, and set up a number of competitors without a tax?—Not if they did not sell beer; I do not think they would complain then.

3496. You would deprive him of his custom; I do not mean to say that that is a bad thing, still that it would be the result?—Still, generally speaking, he has treated his customers badly; as a body, the publicans have supplied adulterated beer; but they would not shut up altogether, I think.

3497. Do you know from your experience whether the public-houses are fewer and better conducted in those places where there is cottage brewing than in others?—I should think so; I was brought up in a parish where there was no public-house whatever; they nearly all brewed there, and I believe they were a sober set of men; but then it was a small parish under the control of a few of us.

3498. We heard from a former witness, that the labourers, after the repeal of the malt tax, would still go to the public-house because they like the company in the room?—The young people would; but still I think that the result upon the labourers would be like introducing wine into the farmer's class. Men of my own class used to get drunk pretty well every market-day, but now they have got the wine into their own houses and become sober men. I may say that we hardly ever see a man in our county drunk out of his own stores.

3499. I suppose you agree with other people in thinking that public-house beer is more intoxicating than pure beer?—Decidedly. Speaking of the wholesomeness of beer, I took it into my head to get the returns from several hospitals in this country as to their consumption of beer, and I have the returns by me. I was wonderfully surprised to see the amount of beer that was drunk at hospitals by the advice and the direction of, you might say, the head of the medical profession.

3500. *Chairman.*] What hospitals have you applied to?—I applied to some of our local ones, and to others also; Bury St. Edmund's Hospital, Colchester, London Orphan, London Fever, Guy's, Bartholomew's, and St. Thomas's.

3501. And what was the proportion of beer per head to patients?—That I cannot tell; I only know that it would save some of those establishments 300 *l.* a year to repeal the malt tax.

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At St. Thomas's, adopting Mr. Gladstone's idea that the tax on beer amounts to from 25 to 27 per cent. (my own opinion is that the tax on beer is 33 per cent.), it would save the hospital 350 *l.* a year.

3502. Mr. *Goschen.*] That is if there were no beer duty?—Yes.

3503. Lord *Eustace Cecil.*] That means the total repeal of the malt tax, not a total repeal of the beer tax?—No, not the 3 *d.* a barrel. I find that they spend 1,400 *l.* a year for malt liquor at St. Thomas's. My own notion is that the tax is about 30 per cent.; Mr. Gladstone's notion is that it is 25 or 27. Taking it at that then there would be 350 *l.* a year saved by the repeal.

3504. *Chairman.*] I have gathered that your great object is to get the malt tax taken off malt and placed upon beer?—My great object would be to repeal the tax totally; but if I am told that that is impossible, I would say, get it in a more direct way from the consumer, by putting it on beer.

3505. You would infinitely prefer the tax upon beer, notwithstanding the impositions that might be placed on private brewing, rather than retain the malt tax?—Most decidedly; I am sure it would come to less money in the end for me to pay.

3506. I also gathered from your evidence that you thought that that would be no hardship upon the brewer and no hardship upon the farmer; but that you did think that, if possible, the labouring man who brewed a bushel of malt should be excused the tax?—Yes.

3507. As I understand you, you would leave the arrangement of all that part of the scheme to those who are better able to deal with it than you are yourself?—Most decidedly.

3508. But, looking at the whole question, you think, looking at what free trade has done, you ought to have free trade in barley in the same as is allowed in everything else in this country?—Just so; and if it were put on beer it would not trammel me as an agriculturist; it would then become more like a spirit duty, where the taxation is proportionate to the merit of the article. In Scotland and Ireland, where so much spirit is drunk, barley is taxed according to its merit.

3509. Sir *E. M. Buller.*] You said that if the same duty were raised by a duty upon beer, it would be less per bushel than it is now; have you gone into that question, and ascertained what is the tax per barrel of beer with the present duty, and what would be the tax if the same amount of money was raised by a tax on beer; take, for instance, the tax upon a barrel of beer of 36 gallons; you know that the Government gets a tax there upon two bushels of malt?—Yes.

3510. That is 5 *s.* 2 *d.*, is it not?—It is 21 *s.* 8 *d.* a quarter; that is 2 *s.* 8½ *d.* a bushel; that would be 5 *s.* 5 *d.* for the two bushels.

3511. That is what the Government now gets upon a barrel of beer?—Yes; but with the profits it amounts to a great deal more before the barrel is sold.

3512. I want to know whether you have ever followed it out and ascertained what is the tax upon a barrel of beer in consequence of that duty of 5 *s.* 5 *d.* upon the malt; what is the additional price charged on beer to the consumer as the result of that tax?—I have never worked it out so; but I have come to the conclusion that it is 30 per cent. on the charged price of beer, generally speaking. Mr. Gladstone says 25 or 27 per cent., but I think it is 30 to 33 per cent. that the duty represents.

3513. You begin by 2 *s.* 8½ *d.* for the bushel as the tax upon what costs about 4 *s.*?—Yes, just so.

3514. That is something like 50 per cent.?—Yes; more than that. If we take the lower class of barley, you may call it 70 per cent.

3515. As that passes through the hands of the maltster, there is the profit to be taken by the maltster, the profit to be taken by the brewer, and that to be taken by the retailer?—Just so, and very often an agent or two between.

3516. The consequence of which is that your barrel of beer costs 36 *s.* when sold by the brewer to the retailer?—Yes.

3517. The Government have got only 5 *s.* 5 *d.* out of that; but the price of that beer is 36 *s.* If you were to make it without the malt duty, what do you calculate you could make it at?—Two bushels of malt would be 16 *s.*

3518. But two bushels of malt, if you had no malt tax, would be very little more than the price of the barley?—Yes.

3519. That would be 8 *s.* for the two?—Yes.

3520. What would you take your hops at?—One shilling and threepence a pound.

3521. That would be 2 *s.* 6 *d.* for your hops?—Yes.

3522. That is only 10 *s.* 6 *d.* for the raw material; what would the brewing cost?—I think that it can be done for about 5 *s.* a quarter.

3523. That would be 1 *s.* 3 *d.* upon the barrel?—Yes.

3524. Then do not you calculate that the grains and the yeast pay you for the brewing?—Very nearly; they do me, having the grains right on the premises and the yeast.

3525. But even calculating 1 *s.* 3 *d.* as the expense of brewing, 11 *s.* 9 *d.* would be the cost of a barrel of beer without the tax?—Yes; I have no doubt that it would be about that.

3526. Then, between 11 *s.* 9 *d.* and 36 *s.* there is 24 *s.* 3 *d.*, and that 24 *s.* 3 *d.* consists of the duty and the aggravation of the duty before the beer reaches the consumer?—Yes, it consists of duty and the profits, and the guarding against bad debts (there is a good deal in that, in those small trades), and all those other things.

3527. So, it comes out that there is 24 *s.*, that is to say that two-thirds of the cost of the beer, to be absorbed by duty, interest on that duty, and profits?—Yes; guarantee against losses and profits.

3528. But the interest on the duty must of course be equal to the rate of profit obtained by the brewer or the maltster on the rest of his capital?—Decidedly.

3529. If he is making, say, 25 per cent. by his capital employed in the raw material, he must obtain 25 per cent. on that part of his capital which is employed in the payment of the Government duty, must he not?—Decidedly; he would require it equally over every item.

3530. That would also accrue upon the brewer as well as upon the maltster?—Yes.

3531. So that you would have the original charge of the Government aggravated by 25 per cent., supposing that to be the maltster's profit?—Maltsters do not get that profit.

3532. We may take it that it is 12 per cent., perhaps?—Yes.

3533. What do you think the brewer's profit is?—Their profit is 20 per cent. I should say; I do

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o not mean that they have 20 per cent. net rofits; but to guard against bad debts and so on, must amount to that.

3534. Then the retailers we know sell 36 allons at 1 *s.* 4 *d.* a gallon?—Yes, and they give out 1 *s.* a gallon for it. There is the use of the oom that you have to take into account.

3535. That comes up to something like 50 or per cent. that must be added on to the Go-ernment as the incidence of taxation upon the eer?—I am convinced that it would come to ore than 50 per cent. You see that time adds great deal to it; a great deal of our malt is ept all over the summer, though it is made three uarters of a year before.

3536. Mr. *Henry Surtees.*] Do you know what e duty on foreign malt is per quarter?—Yes; is 25 *s.* per quarter.

3537. And the duty on English malt is *s.* 8 *d.*?—Yes.

3538. Then, the difference of duty upon reign malt and English is 3 *s.* 4 *d.* a quarter?—es, including that shilling which is put on all orn as import duty.

3539. Is not the difference in the amount of uty charged upon foreign malt, as compared with nglish malt, imposed as a partial compensation r the restrictions, annoyances, inconveniences, d penalties which English maltsters are sub-cted to by the excise laws?—I think it is.

3540. Do you think that, taking those things to account, that compensation is more than is asonable?—Very little more, because they can ay that duty when they please; they can keep in bond in France, or anywhere else, and not ring it here till they want it; whereas, if I were maltster I should have to make malt, and pay e duty this year, and it is, perhaps, not used ll next September or October, so that there is accumulation of interest, &c.

3541. Mr. *Read.*] He can bond it in this country?—At any rate, he does not want to send it here and pay the interest.

3542. I think that the tendency of your evidence has been to prove that the agricultural labourer is almost entirely deprived of beer, except at some busy times of the year?—Yes, except hay and harvest, they can hardly taste it; they get a few pence now and then to spend on it; I know men who walk four miles on a Sunday to go and get a gallon of beer to fetch home to their families.

3543. Where do they walk to?—To the public-house; they walk two miles to the public-house with their bottle and fill it, and then bring it home, a distance of two miles, to their families to drink it; my own labourers often walk two miles at a time to fetch it.

3544. The effect of the malt tax on the other classes of the community, you think is that they get bad beer and dear beer?—Yes, just so.

3545. It does not deprive them of beer?—Well, it deprives them of a great deal, and it makes what they do get of an inferior quality.

3546. Are you aware that when the import duty upon malt was fixed at 25 *s.* it was the universal impression of the trade, that a very large quantity of foreign malt would be imported?—I cannot say that I am aware of that.

3547. You do not know that Mr. Bass was of that opinion?—No, I cannot say that I have any knowledge of that.

3548. Or are you aware that it was the opinion that a great quantity of malt would be sent from Hamburgh?—I remember that Sir Fitzroy Kelly spoke about it, and contended that 25 *s.* was only an equivalent to put the foreigners in a similar position to ourselves.

3549. And you know that the practical result is, that no malt has been sent to you?—No; no malt, but a great deal of barley.

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Appendix, No. 1.

PAPERS handed in by Mr. *W. H. Stephenson*, 25 June 1867.

MALT ACTS IN FORCE.

DUTY ACT.—6 Geo. 4, c. 58, and Treasury Letter, 11 May 1826.

For General Purposes.	Year.
Anne, stat. 1, c. 2, s. 7	—
Geo. 1, stat. 2, c. 2, s. 13	—
& 8 Geo. 4, c. 52	1827
Geo. 4, c. 17	1830
Vict. c. 49	1837
& 19 Vict. c. 94, s. 35	1855
& 23 Vict. c. 18, s. 7	1859
& 24 Vict. c. 113	1860
Vict. c. 3	1863
& 28 Vict. c. 56, s. 11	1864
& 29 Vict. c. 66, s. 11	1865
For Charge on Bear or Bigg.	
Geo. 4, c. 30	1822
Geo. 4, c. 31	1830

For Distillery Purposes and Exportation.	Year.
1 Geo. 1, stat. 2, c. 2, s. 13 (exportation)	—
18 & 19 Vict. c. 94	1855
23 & 24 Vict. c. 113	1860
28 & 29 Vict. c. 66, ss. 13, 14	1865
29 & 30 Vict. c. 64, ss. 5, 6	1866
For Animals.	
27 Vict. c. 9	1864
For Duty by Weight of Barley.	
28 & 29 Vict. c. 66	1865
Roasted Malt.	
5 Vict. Sess. 2, c. 30	1842
19 & 20 Vict. c. 34, s. 19	1856

MALT charged with DUTY, &c., in the Ten Years ended 31st March 1866.

Year ending March.	Bushels of Malt charged with Duty.				Bushels of Malt exported on Drawback from United Kingdom.	Bushels of Malt made Duty Free for Cattle Feeding.	Bushels of Malt made Duty Free for Exportation and Distillation.				Total Bushels of Malt relieved from Duty in United Kingdom.
	England.	Scotland.	Ireland.	United Kingdom.			England.	Scotland.	Ireland.	United Kingdom.	
1857	36,313,926	1,122,303	1,691,159	39,127,388	5,364	- -	732,182	3,326,973	886,328	4,945,483	4,950,847
1858	38,015,619	1,313,918	1,834,717	41,164,254	–	- -	585,592	3,933,165	906,575	5,425,332	5,425,332
1859	39,094,653	1,537,876	2,161,520	42,794,049	255	- -	556,732	3,836,691	768,682	5,162,105	5,162,360
1860	40,715,457	1,600,504	2,249,025	44,564,986	–	- -	597,230	4,060,746	722,431	5,380,407	5,380,407
1861	33,692,788	1,554,658	2,119,108	37,366,554	104,751	- -	554,526	3,281,912	443,128	4,279,566	4,384,317
1862	41,314,218	1,727,936	2,513,760	45,555,914	210,831	- -	607,458	2,861,059	433,053	3,901,570	4,112,401
1863	37,425,456	1,720,281	1,919,093	41,064,830	202,365	Commenced 23 April 1864.	529,011	3,255,325	423,986	4,208,322	4,410,687
1864	43,569,186	1,955,363	2,406,400	47,930,949	247,985	- -	585,862	3,638,897	508,309	4,733,068	4,981,053
1865	43,955,940	2,092,699	2,489,774	48,538,413	212,735	60,247	578,500	3,612,553	628,134	4,819,187	5,092,169
1866	45,190,369	2,499,498	2,473,620	50,163,487	368,846	29,094	459,046	3,493,803	645,003	4,597,852	4,995,792

App. No. 1.

Account of the Net Receipt of Malt Duty for last Ten Years.

—	England.	Scotland.	Ireland.	United Kingdom.
	£.	£.	£.	£.
1857	5,338,970	148,281	203,698	5,690,949
1858	4,940,765	154,029	231,228	5,326,022
1859	4,965,320	174,212	273,245	5,412,777
1860	6,084,212	224,625	340,044	6,648,881
1861	5,679,631	205,511	323,671	6,208,813
1862	5,312,379	218,442	335,482	5,866,302
1863	4,907,408	205,369	277,132	5,389,909
1864	5,547,553	239,318	305,866	6,092,736
1865	5,800,660	251,230	342,664	6,394,553
1866	5,795,659	299,339	326,262	6,421,260

Rates of Drawback on Beer Exported on and after the 11th October 1862.

25 Vict. c. 22, Schedule (B.)

If the Specific Gravity of the Worts before Fermentation shall not have been less than	Drawback per Barrel.		If the Specific Gravity of the Worts before Fermentation shall not have been less than	Drawback per Barrel.	
	s.	d.		s.	d.
1040°	4	3	1085°	8	9
1045°	4	9	1090°	9	3
1050°	5	3	1095°	9	9
1055°	5	9	1100°	10	3
1060°	6	3	1105°	10	9
1065°	6	9	1110°	11	3
1070°	7	3	1115°	11	9
1075°	7	9	1120°	12	3
1080°	8	3	1125°	12	9

Account of Sugar used by Brewers in each Year since the passing of the Act 10 Vict. c. 5.

Year.	Pounds Weight of Sugar.	Equivalent Quantity of Malt.	Year.	Pounds Weight of Sugar.	Equivalent Quantity of Malt.
	Lbs.	*Bushels.*		*Lbs.*	*Bushels.*
1847	8,114,736	309,132	1858	3,113,164	118,596
1848	2,787,344	106,184	1859	2,861,893	109,024
1849	1,839,152	70,063	1860	6,122,402	233,234
1850	1,105,328	42,107	1861	9,554,011	363,962
1851	737,968	28,113	1862	8,718,070	332,116
1852	815,024	31,048	1863	10,252,859	390 585
1853	1,484,112	56,537	1864	7,899,889	300,948
1854	3,395,168	129,339	1865	3,698,180	140,883
1855	1,792,112	68,270	1866	7,628,206	290,598
1856	2,220,176	84,578	1867	26,532,403	1,010,758
1857	2,328,793	88,715			

Appendix, No. 2.

App. No. 2.

PAPERS handed in by Mr. *William Carling*, 27 June 1867.

AMOUNT of DUTY on BREWERS' LICENCES, and HOP DUTY.

YEAR.	Duty on Brewers' Licenses.	Hop Duty.	TOTAL Brewers' Licenses and Hop Duty.	TOTAL Brewers' Licenses.
	£.	£.	£.	£.
1852	80,611	447,143	527,754	—
1853	82,342	277,807	360,149	—
1854	79,887	86,422	166,309	—
1855	76,646	728,183	804,829	—
1856	78,167	488,850	567,017	—
1857	79,493	417,526	497,019	—
1858	78,464	464,842	543,306	—
1859	80,662	599,346	680,008	—
1860	80,928	69,767	150,695	—
1861	77,814	149,709	227,523	—
1862	302,403	- -	- -	302,403
1863	353,541	- -	- -	353,541
1864	378,092	- -	- -	378,092
1865	384,966	- -	- -	384,966
1866	443,080	- -	- -	443,080
TOTAL - - - £.	2,657,096	3,729,595	4,524,609	1,862,082
Average of Ten Years			452,461	
Average of Five Years				372,416

NUMBER of MALTHOUSES in the UNITED KINGDOM.

Year.	Number.	Year.	Number.	Year.	Number.
1832	13,755	1844	12,777	1856	10,329
1833	13,903	1845	12,416	1857	10,161
1834	14,025	1846	12,259	1858	10,127
1835	14,149	1847	12,113	1859	10,118
1836	14,428	1848	11,827	1860	10,086
1837	14,487	1849	11,647	1861	10,017
1838	14,433	1850	11,469	1862	9,963
1839	14,275	1851	11,408	1863	9,783
1840	13,947	1852	11,286	1864	9,732
1841	14,021	1853	11,106	1865	9,639
1842	13,662	1854	11,181	1866	9,652
1843	13,252	1855	10,740	1867	9,703

NUMBER of MALTSTERS' LICENCES issued in the UNITED KINGDOM.

Year.	Number of Licences Issued.	Year.	Number of Licences Issued.	Year.	Number of Licences Issued.
1832	12,824	1844	9,832	1856	7,046
1833	13,242	1845	9,511	1857	6,966
1834	12,891	1846	9,578	1858	6,909
1835	12,808	1847	9,010	1859	6,798
1836	12,830	1848	8,730	1860	6,567
1837	12,283	1849	8,399	1861	6,545
1838	11,975	1850	8,362	1862	6,250
1839	11,611	1851	8,166	1863	6,207
1840	11,621	1852	8,031	1864	6,112
1841	11,134	1853	7,805	1865	6,021
1842	10,488	1854	7,460	1866	5,821
1843	10,187	1855	7,239		

RETURN of the Number of PROSECUTIONS of MALTSTERS for OFFENCES against the MALT LAWS duri
the last Ten Years ending 31st March 1867.

—	Wetting without Notice.	Draining Cistern illegally.	Removing Grain from Cistern illegally.	Compressing Grain in Couch Frame.	Concealing Grain making into Malt.	Mixing Grain on Floor or Kiln.	Sprinkling Grain in operation illegally.	Steeping Barley and making Malt privately.	Altering Dimensions of Couch Frame illegally.	Removing Grain from Couch Frame before the legal time.	Having illegal Couch Frames.	Refusing to throw Grain out of Couch Frame.	Having Grain in Couch Frame a greater depth than 30 inches.	Adding Grain to Cistern after being gauged.	Having Barley in a Malthouse entered for Bear & Bigg.	False Declaration of Weight of Barley.	TOTAL.
ENGLAND -	27	8	24	54	29	3	6	25	1	1	2	2	3	1	–	–	1
SCOTLAND -	–	–	2	3	1	–	3	1	–	–	–	–	–	–	1	–	
IRELAND -	–	–	4	7	3	5	1	6	–	–	–	–	–	–	–	1	
TOTAL -	27	8	30	64	33	8	10	32	1	1	2	2	3	1	1	1	2

The Malthouses in which the above Detections were made were Surveyed as follows:

———	Daily.	Four times a Week.	Five times a Fortnight.	TOTAL.
ENGLAND - - - - - - -	94	30	62	186
SCOTLAND - - - - - - -	8	3	- -	11
IRELAND - - - - - - -	24	3	- -	27
TOTAL - - -	126	36	62	224

ACCOUNT of the Quantities of MALT EXPORTED from the UNITED KINGDOM for each of the past Ten Years, to the 31st December 1866, showing the Countries to which sent.

COUNTRIES to which EXPORTED.	MALT EXPORTED FROM THE UNITED KINGDOM.									
	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushel*
Russia - - - -	–	8	–	–	–	12,312	–	–	–	–
Sweden - - - -	–	64	144	–	96	16	–	–	56	–
Denmark - - - -	–	–	72	–	–	80	456	–	88	24
Prussia - - - -	–	–	–	–	24	–	–	144	–	–
Hanse Towns - - -	24	8	–	–	–	–	8	712	160	–
Holland - - - -	–	–	1,000	240	–	–	7,120	5,280	–	–
Belgium - - - -	–	40	–	96	2,928	3,248	128	9,888	20,256	744
Channel Islands - -	24	2,896	568	96	1,864	920	256	1,848	3,128	3,992
France - - - -	9,160	256	64	400	8	432	648	56	4,248	120
Portugal, Azores, and Madeira.	1,216	3,472	1,344	1,568	760	1,208	2,112	3,992	368	1,560
Spain - - - -	–	–	–	–	144	120	160	168	–	–
Gibraltar - - - -	–	–	–	96	96	152	–	168	32	160
Naples - - - -	–	–	–	–	–	–	–	48	–	–
Malta - - - -	24	8	24	176	128	248	56	–	152	48
Turkey - - - -	–	–	–	–	–	–	–	40	240	–
Egypt - - - -	–	–	–	48	–	24	–	–	–	–
British Possessions on the Gold Coast.	–	–	–	–	–	–	–	8	–	8

ACCOUNT of the Quantities of Malt Exported from the United Kingdom for each of the past Ten Years, &c.—*continued.*

COUNTRIES to which EXPORTED.	MALT EXPORTED FROM THE UNITED KINGDOM.									
	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
r sh Possessions in South frica.	1,528	1,184	640	1,608	2,520	6,184	4,680	1,216	7,256	6,016
ıritius - - -	–	–	8	–	–	–	–	–	–	–
ish India - - -	8	8	8	16	64	1,600	1,616	–	32	–
ıa - - - -	–	–	–	8	–	–	–	–	400	768
g Kong - - -	–	–	–	16	–	–	–	–	–	–
t Australia - - -	–	–	–	–	24	–	–	8	–	–
h Australia - -	30,696	24,944	26,392	27,944	37,680	37,832	53,336	20,496	36,320	67,848
oria - - - -	122,064	177,672	229,488	201,384	258,304	292,704	339,608	303,544	287,176	318,992
South Wales - -	35,768	44,928	44,112	41,048	35,936	51,576	50,152	49,456	48,328	54,264
ensland - - -	–	–	–	–	–	–	–	–	824	800
nania - - -	35,560	42,376	15,464	12,272	15,496	3,200	5,752	3,144	1,144	3,800
Zealand - - -	2,800	–	152	–	3,744	8,912	30,352	49,800	75,136	99,648
ish North America -	3,112	2,176	3,384	2,080	1,496	2,320	4,448	3,832	976	2,264
ish West Indies - -	40	24	40	24	320	24	96	40	32	8
ish Honduras - -	–	–	–	–	–	–	–	8	–	–
ted States of America -	9,176	208	16	16	–	–	40	–	–	–
tral America - -	744	1,664	1,760	1,200	–	–	–	8	8	16
Granada - - -	–	1,040	224	368	–	–	–	–	–	–
ı - - - - -	–	–	–	–	–	56	–	176	344	240
zil - - - - -	456	112	144	408	592	1,784	1,376	2,720	6,576	4,888
es of the Argentine Con- ederation.	–	–	–	–	–	8	–	–	–	–
TOTAL - - -	252,400	303,088	325,048	291,112	362,224	424,960	502,400	456,800	493,280	566,208

ffice of the Inspector General of Imports and Exports,
Custom House, London, 29 July 1867.

Edward Bernard,
Inspector General.

COUNT of the Quantities of FOREIGN MALT IMPORTED into the UNITED KINGDOM in each Year since the passing of the Act 23 & 24 Vict. c. 110 (28th August 1860), to the 31st December 1866.

YEARS.	Quantities of Malt Imported into the United Kingdom.
	Bushels.
From 28th August 1860 - - - - - - -	—
1861 - - - - - - -	5
1862 - - - - - - -	183
1863 - - - - - - -	140
1864 - - - - - - -	36
1865 - - - - - - -	—
1866 - - - - - - -	1,895

App. No. 2.

FOREIGN COUNTRIES IN WHICH BARLEY IS GROWN.

The only Information available as to the Growth of Barley in Foreign Countries is contained in a Parliamentary Return of the Acreage of Land under Crops in the United Kingdom in the Year 1866. The following are the Particulars:—

COUNTRIES.	English Statute Acres under Barley or Bere Crops.
Sweden - - - - - - - - -	615,000
Denmark Proper - - - - - - -	687,179
Wurtemburgh - - - - - - -	237,904
Bavaria - - - - - - - - -	838,779
Holland - - - - - - - - -	104,315
Belgium - - - - - - - -	110,130
France - - - - - - - - -	2,570,853
Austria - - - - - - - - -	2,755,415

Inland Revenue Office, 27 July 1867.

Appendix, No. 3.

PAPERS received from the BOARD of INLAND REVENUE.

App. No. 3.

GLUCOSE.

THE term glucose is applied to a description of sugar which is found in the grape and many other fruits. It is prepared artificially by acting on farinaceous substances, by means of dilute sulphuric acid, at a certain temperature. It is less sweet in taste than ordinary cane and beet sugars, and this may be partially due to the fact that it contains a greater proportion of the elements of water than those sugars.

A patent has been recently obtained for converting cane into grape sugar or glucose for use in brewing by acting on a solution of cane sugar by means of dilute sulphuric acid. It is made by a Mr. Hill at Southampton, and has obtained considerable favour amongst brewers on account of its supposed power of imparting keeping properties to beer. The present consumption of this kind of sugar is estimated at about 50 tons a week, or over five and three quarter millions of pounds a year. This consumption of glucose, as well as that of sugar generally in brewing, depends upon the prices of those substances as compared with malt; but even if a considerable reduction were to occur in the price of malt, the use of glucose or saccharum might to some extent be maintained, if experience proves it to possess the power of imparting those keeping properties to beer which is at present ascribed to it.

Laboratory, Inland Revenue,
2 July 1867.

G. Phillips.

ENGLAND.

NUMBER of BARRELS of BEER BREWED in the Years 1684 to 1830 inclusive.

YEARS ENDED	NUMBER of BARRELS.		YEARS ENDED	NUMBER of BARRELS.	
	Strong.	Small.		Strong.	Small.
24 June 1684	4,384,093	1,933,924	24 June 1715	3,434,408	2,035,430
„ 1685	4,654,564	2,102,021	„ 1716	3,485,886	2,012,841
„ 1686	4,780,097	2,255,062	„ 1717	3,595,857	2,084,660
„ 1687	5,044,311	2,435,169	„ 1718	3,716,448	2,165,101
„ 1688	4,989,000	2,543,856	„ 1719	3,800,863	2,256,387
„ 1689	5,134,309	2,707,726	„ 1720	3,787,913	2,277,216
„ 1690	4,690,711	2,645,656	„ 1721	3,735,859	2,180,230
„ 1691	4,069,544	2,374,731	„ 1722	3,794,829	2,195,614
„ 1692	3,796,805	2,378,642	„ 1723	3,853,483	2,251,908
„ 1693	3,529,498	2,385,996	„ 1724	3,873,723	2,313,234
„ 1694	3,505,470	2,466,323	„ 1725	3,796,623	2,186,972
„ 1695	3,344,377	2,212,326	„ 1726	3,642,161	2,205,133
„ 1696	3,680,478	2,388,703	„ 1727	3,703,614	2,213,411
„ 1697	3,258,056	2,162,286	„ 1728	3,443,331	2,165,504
„ 1698	3,097,225	2,006,678	„ 1729	3,309,973	2,044,051
„ 1699	2,973,464	1,920,810	„ 1730	3,532,800	2,081,196
„ 1700	3,152,080	1,970,769	„ 1731	3,644,971	2,111,866
„ 1701	3,364,121	2,082,031	„ 1732	3,704,138	2,184,484
„ 1702	3,721,345	2,319,268	„ 1733	3,690,261	2,180,894
„ 1703	3,649,426	2,278,451	„ 1734	3,679,290	2,153,429
„ 1704	3,762,521	2,335,197	„ 1735	3,524,500	2,103,654
„ 1705	3,807,257	2,333,333	„ 1736	3,552,351	2,110,563
„ 1706	3,629,897	2,214,436	„ 1737	3,612,507	2,073,165
„ 1707	3,653,664	2,225,069	„ 1738	3,531,225	2,015,193
„ 1708	3,566,404	2,155,382	„ 1739	3,604,001	2,079,987
„ 1709	3,357,250	2,066,384	„ 1740	3,515,185	2,084,982
„ 1710	3,217,227	1,983,735	„ 1741	3,295,288	1,984,817
„ 1711	3,154,488	1,971,735	„ 1742	3,457,710	2,082,673
„ 1712	3,143,476	1,926,473	„ 1743	3,469,312	2,020,879
„ 1713	3,299,536	1,938,000	„ 1744	3,601,331	2,041,810
„ 1714	3,415,452	2,000,557	„ 1745	3,479,134	1,971,893

ENGLAND.—NUMBER of Barrels of Beer Brewed in the Years 1684 to 1830 inclusive—*continued.*

YEARS ENDED	NUMBER of BARRELS.	
	Strong.	Small.
24 June 1746	3,416,055	2,035,271
,, 1747	3,579.933	2,008,932
,, 1748	3,621,475	2,085,656
,, 1749	3,706,649	2,011,065
,, 1750	3,735,808	2,056,389
,, 1751	3,773,164	2,060,357
,, 1752	3,770,711	1,966,147
5 July 1753	3,761,772	1,948,138
,, 1754	3,732,571	1,933,759
,, 1755	3,693,982	1,914,504
,, 1756	3,780,126	1,975,779
,, 1757	3,496,987	1,936,663
,, 1758	3,717,225	1,877,368
,, 1759	3,908,094	1,834,128
,, 1760	4,136,548	1,992,126
,, 1761	4,062,176	1,972,799
,, 1762	3,804,891	1,972,454
,, 1763	3,759,218	1,848,409
,, 1764	3,823,599	1,795,775
,, 1765	3,689,703	1,745,593
,, 1766	3,682,287	1,800,012
,, 1767	3,624,560	1,744,866
,, 1768	3,730,791	1,740,629
,, 1769	3,791,150	1,690,370
,, 1770	3,783,009	1,701,870
,, 1771	3,767,141	1,733.425
,, 1772	3,791,246	1,695,247
,, 1773	3,803,772	1,717,195
,, 1774	3,601,447	1,676,256
,, 1775	3,863,119	1,615,892
,, 1776	3,958,553	1,676,795
,, 1777	4,107,345	1,625,175
,, 1778	4,129,989	1,708,807
,, 1779	4,196,693	1,797,881
,, 1780	4,355,276	1,881,489
,, 1781	4,342,621	1,825,094
,, 1782	4,524,899	1,908,373
,, 1783	3,914,406	1,324,782 Table 451,582
,, 1784	4,337,662	1,306,263 467,984
,, 1785	4,328,750	1,243,557 446,896
,, 1786	4,146,512	1,276,085 462,490
,, 1787	4,426,482	1,342,301 485,620
,, 1788	4,304,895	1,334,947 524,176
,, 1789	4,437,831	1,244,046 514,900
,, 1790	4,525,950	1,282,157 546,260
,, 1791	4,754,588	1,347,086 579,742
,, 1792	5,082,293	1,401,870 625,260
5 July 1793	5,167,850	1,414,255 620,207
,, 1794	5,011,320	1,446,939 586,554
,, 1795	5,037,804	1,453,036 576,464
,, 1796	5,504,453	1,479,130 565,630
,, 1797	5,839,627	1,518,512 584,422
,, 1798	5,784,467	1,547,570 622,064
,, 1799	5,774,311	1,597,139 611,151
,, 1800	4,824,306	1,360,502 574,995
,, 1801	4,735,574	1,191,930 500,025
,, 1802	5,345,884	976,786 392,022
		“Table.”
,, 1803	5,585,986	1,658,317
,, 1804	5,265,623	1,779,570
,, 1805	5,412,131	1,776,807
,, 1806	5,443,502	1,771,754
,, 1807	5,577,175	1,732,711
,, 1808	5,571,360	1,710,243
,, 1809	5,513,111	1,682,899
,, 1810	5,753,319	1,635,588
,, 1811	5,902,903	1,649,564
,, 1812	5,860,865	1,593,398
,, 1813	5,382,946	1,455,759
,, 1814	5,624,015	1,432,729
,, 1815	6,150,544	1,518,302
,, 1816	5,982,379	1,514,867
,, 1817	5,236,048	1,453,960
,, 1818	5,364,006	1,434,642
,, 1819	5,629,240	1,460,244
,, 1820	5,296,701	1,444,290
,, 1821	5,575,830	1,439,970
,, 1822	5,712,937	1,492,281
,, 1823	6,177,271	1,419,589
,, 1824	6,188,271	1,401,021 Intermediate 16,237
,, 1825	6,500,664	1,485,750 9,559
Half-year to 5 January 1826	3,198,079	777,582 2,565
5 January 1827	6,697,133	1,603,653 7.707
,, 1828	6,403,307	1,532,312 17,159
,, 1829	5,949,294	1,380,470 55,498
9 Months to 10 October 1830	3,570,332	1,066,263 41,834
Duty repealed.		

Inland Revenue Office,
17 July 1867.

Fred. Gripper,
Chief Accountant.

RETURN of the CONSUMPTION of BEER and MALT per Head of the Population in *England*, showing concurrently what was the Incidence of the Beer Tax in addition to the Duty on Malt in Decennial Periods, from the Year 1697 to 1830.

Period.	Estimated Average Population.	Average Consumption per Head of the Population.		RATES OF DUTY.		Revenue paid per Head of the Population.	
		Gallons of Beer.	Bushels of Malt.	Beer per Barrel.	Malt per Bushel.	Beer.	Malt.
						s. *d.*	*s.* *d.*
1697—1706 -	6,121,525	31,126	No account	Strong beer, 4 *s.* 9 *d.* - - Small beer, 1 *s.* 3 *d.* - -	6 *d.* - - - - - -	3 $1\frac{4}{12}$	No account.
1707—1716 -	6,252,105	29,389	3,777	Strong beer, 4 *s.* 9 *d.* and 5 *s.* - Small beer, 1 *s.* 3 *d.* and 1 *s.* 4 *d.*	6 *d.* - - - - - -	3 $-\frac{3}{4}$	1 $10\frac{8}{12}$
1717—1726 -	6,252,750	32,470	4,624	Strong beer, 5 *s.* - - - Small beer, 1 *s.* 4 *d.* - -	6 *d.* - - - - - -	3 $5\frac{3}{4}$	2 $3\frac{3}{4}$
1727—1736 -	6,182,972	31,418	4,281	- ditto - ditto - -	6 *d.* - - - - - -	3 $4\frac{1}{4}$	2 $1\frac{8}{12}$
1737—1746 -	6,153,227	30,596	4,231	- ditto - ditto - -	6 *d.* - - - -	3 $3\frac{5}{12}$	2 $1\frac{4}{12}$
1747—1756 -	6,335,840	30,650	4,255	- ditto - ditto - -	6 *d.* - - - - - -	3 $4\frac{1}{4}$	2 $1\frac{1}{2}$
1757—1766 -	6,720,547	28,764	3,771	Strong beer, 5 *s.* and 8 *s.* - Small beer, 1 *s.* 4 *d.* - -	6 *d.*, and additional 3 *d.* -	4 $1\frac{7}{12}$	2 $6\frac{5}{12}$
1767—1776 -	7,153,494	26,001	3,550	Strong beer, 8 *s.* - - - Small beer, 1 *s.* 4 *d.* - -	- - ditto - ditto - -	4 $6\frac{5}{12}$	2 8
1777—1786 -	7,573,787	26,984	3,458	Strong beer, 8 *s.* - - - Table beer, 3 *s.* - - - Small beer, 1 *s.* 4 *d.* - -	6 *d.*, additional 3 *d.*, and 15 per cent. thereon, and further additional 6 *d.*, and 5 per cent. thereon; total, 1 *s.* $3\frac{3}{4}$ *d.*	4 $9\frac{11}{12}$	*3 $-\frac{10}{12}$
1787—1796 -	8,255,617	27,813	3,156	- ditto - ditto - -	1 *s.* $3\frac{3}{4}$ *d.*, and additional 3 *d.* -	5 $1\frac{1}{4}$	*3 $1\frac{1}{2}$
1801—1810 -	9,592,192	26,338	2,567	Strong beer, 8 *s.* and 10 *s.* - Table beer, 3 *s.* and 2 *s.* - Small beer, 1 *s.* 4 *d.* - -	2 *s.* 4 *d.* and † 2 *s.* war duty; total, 4 *s.* 4 *d.*	5 $9\frac{1}{2}$	9 $1\frac{1}{2}$
1811—1820 -	11,103,248	22,520	2,141	Strong beer, 10 *s.* - - - Table beer, 2 *s.* - - -	4 *s.* 4 *d.*, 2 *s.* 4 *d.*, and 3 *s.* 6 *d.* -	5 $2\frac{5}{12}$	7 $8\frac{1}{12}$
1821—1830 -	12,976,941	21,244	2,089	Strong beer, 10 *s.*, 9 *s.*, and 9 *s.* 10 *d.* Table beer, 2 *s.*, 1 *s.* $9\frac{1}{2}$ *d.*, and 1 *s.* $11\frac{1}{2}$ *d.* Intermediate, 5 *s.* and 4 *s.* 11 *d.*	3 *s.* 6 *d.*, 2 *s.* 6 *d.*, and 2 *s.* 7 *d.*	4 $9\frac{11}{12}$	5 $7\frac{1}{2}$

Note.—* Allowances were granted to brewers in the years 1781 to 1799, under the Act 20 Geo. 3, cap. 35, on the quantity of beer brewed.

† War duty on malt of 2 *s* per bushel. Imposed, 1803. Repealed, 1816.

The consumption of malt and the proportion of duty per head of the population given in this return are computed from the total quantity of malt made, inclusive of that used for distillation.

Inland Revenue Office,
19 July 1867.

Fred. Gripper,
Chief Accountant.

App. No. 3.

RETURN of the CONSUMPTION of MALT per Head of the Population in *England*, *Scotland*, and *Ireland*, for the Ten Years previous to 1830.

ENGLAND AND WALES.

YEAR.	Estimated Population.	Total Number of Bushels of Malt charged with Duty.	Average Consumption per Head of the Population.	Number of Bushels of Malt used by Brewers and Victuallers.	Average Consumption per Head of the Population.
1820 - - -	11,903,722	23,884,242	2,002	No account has been kept of the quantities used during these years.	
1821 - - -	12,105,614	26,138,437	2,159		
1822 - - -	12,320,360	26,688,512	2,166		
1823 - - -	12,529,518	24,845,152	1,982		
1824 - - -	12,720,736	27,615,383	2,170	21,646,112	1,717
1825 - - -	12,903,059	29,572,741	2,291	22,567,568	1,756
1826 - - -	13,074,286	27,335,971	2,090	21,037,008	1,609
1827 - - -	13,247,277	25,096,337	1,894	20,575,032	1,553
1828 - - -	13,438,474	30,517,819	2,270	21,124,968	1,572
1829 - - -	13,625,045	23,428,135	1,719	19,255,928	1,413

SCOTLAND.

1820 - - -	2,070,523	1,182,208	570	No account.	—
1821 - - -	2,099,945	1,305,659	621	627,248	298
1822 - - -	2,125,822	1,403,177	660	628,856	295
1823 - - -	2,152,017	1,616,590	751	600,800	279
1824 - - -	2,178,536	2,788,608	1,280	599,832	275
1825 - - -	2,205,383	3,925,847	1,780	683,440	309
1826 - - -	2,232,639	2,726,555	1,221	583,648	261
1827 - - -	2,259,072	2,714,073	1,201	635,848	281
1828 - - -	2,287,924	3,867,159	1,690	660,616	289
1829 - - -	2,316,020	3,712,963	1,603	602,440	260

IRELAND.

1820 - - -	6,712,144	1,793,671	267	1,321,040	196
1821 - - -	6,801,827	1,949,315	286	1,205,120	177
1822 - - -	6,892,708	1,756,391	254	1,395,728	202
1823 - - -	6,984,809	1,702,395	244	1,498,144	214
1824 - - -	7,078,140	2,107,752	299	1,365,560	192
1825 - - -	7,172,722	2,706,862	377	1,336,992	186
1826 - - -	7,268,570	2,406,252	331	1,410,792	194
1827 - - -	7,365,700	1,803,091	244	1,512,608	205
1828 - - -	7,464,131	2,409,228	322	1,402,648	187
1829 - - -	7,563,878	2,012,079	266	1,337,400	176

Inland Revenue Office,
6 July 1867.

Fred. Gripper,
Chief Accountant.

App. No. 3.

RETURN of the RATES of DUTY per Barrel on BEER in *England* from its first Imposition to its Repeal.

PERIOD.	Description of Beer.	Rate of Duty per Barrel.*			Observations.
		£.	*s.*	*d.*	
1660 to 1671 -	Strong beer brewed for sale -	–	2	6	Beer duty commenced 25 December 1660.
	Small beer " " -	–	–	6	
	Beer or ale imported - -	–	6	–	
1671 to 1680 -	Strong beer - - -	–	3	3	
	Small beer - - - -	–	–	6	
	Beer or ale imported - -	–	6	–	
1680 to 1689 -	Strong beer - - -	–	2	6	
	Small beer - - - -	–	–	6	
	Beer or ale imported - -	–	6	–	
1689 -	Strong beer - - -	–	3	3	
	Small beer - - - -	–	–	6	
	Beer or ale imported - -	–	6	–	
1690 -	Strong beer - - -	–	5	9	The excise doubled for one year.
	Small beer - - - -	–	1	–	
	Beer or ale imported - -	–	12	–	
1691 -	Strong beer - - -	–	4	–	
	Small beer - - - -	–	–	6	
	Beer or ale imported - -	–	6	–	
1692 to 1697 -	Strong beer - - -	–	3	3	
	Small beer - - - -	–	–	9	
	Beer or ale imported - -	–	9	–	
1697 to 1710 -	Strong beer - - -	–	4	9	
	Small beer - - - -	–	1	3	
	Beer or ale imported - -	–	15	–	
1710 to 1761 -	Strong beer - - -	–	5	–	
	Small beer - - - -	–	1	4	
	Beer or ale imported - -	–	15	–	
1761 to 1779 -	Strong beer - - -	–	8	–	
	Small beer - - - -	–	1	4	
	Beer or ale imported - -	–	15	–	
1779 to 1781 -	Strong beer - - -	–	8	–	
	Small beer - - - -	–	1	4	
	Beer or ale imported - -	–	15	9	
1781 to 1782 -	Strong beer - - -	–	8	–	Duty on small beer brewed by the common brewers repealed.
	Small beer - - - -	–	1	4	
	Table beer - - - -	–	3	–	
	Beer or ale imported - -	–	16	6	
1782 to 1802 -	Strong beer - - -	–	8	–	Duties consolidated, year 1787.
	Small beer - - - -	–	1	4	
	Table beer - - - -	–	3	–	
	Beer or ale imported - -	–	17	3	
1802 to 1803 -	Strong beer - - -	–	10	–	
	Table beer - - - -	–	2	–	
	Beer or ale imported - -	1	10	2	
1803 to 1823 -	Strong beer - - -	–	10	–	Duties consolidated, 1803.
	Table beer - - - -	–	2	–	
	Beer or ale imported - -	2	–	–	
1823 to 1826 -	Strong beer - - -	–	10	–	
	Table beer - - - -	–	2	–	
	Intermediate beer - -	–	5	–	
	Beer or ale imported - -	2	–	–	Imports transferred to Customs, 1825.
		Imprl. Measure.			
1826 to 1830 -	Strong beer - - -	–	9	–	Common brewers.
	Table beer - - - -	–	1	9½	
	Strong beer - - -	–	9	10	Victuallers.
	Table beer - - - -	–	1	11½	
	Intermediate beer - -	–	4	11	
					Beer Duty repealed, 10 October 1830.

* *Note.*—The barrel of beer brewed in London, 36 gallons } Beer measure.
" ale " " 32 "
" beer or ale in the country, 34 "
" beer or ale imported, 32 " Wine measure.

From 5th July 1803, the barrel of beer brewed by the common brewers, whether within or without the bills of mortality, to be 36 gallons.

Inland Revenue Office,
13 July 1867.

Fred. Gripper,
Chief Accountant.

App. No. 3.

AMOUNT of DUTY per Estimated Barrel of BEER, at the present Rates of Brewers' Licences.

QUANTITY BREWED.	Licence Duty.			Amount. per Barrel.
	£.	s.	d.	d.
Not exceeding - 20 barrels - -	–	12	6	$7\frac{1}{2}$
Not exceeding - 50 " - -	1	7	6	$6\frac{3}{5}$
Not exceeding - 100 " - -	2	–	–	$4\frac{4}{5}$
Not exceeding 1,000 " - -	15	10	–	$3\frac{7}{10}$
Not exceeding 50,000 " - -	701	10	–	$3\frac{4}{10}$
Not exceeding 100,000 " - -	1,326	10	–	$3\frac{2}{10}$
Not exceeding 500,000 " - -	6,326	10	–	$3\frac{1}{25}$

Inland Revenue Office, 8 July 1867.

NUMBER of PERSONS Licensed to BREW in the Three Years before, and the Three Years after, the Repeal of the Beer Duty.

Years Before the Repeal.	Number of Persons Licensed to Brew.	Years After the Repeal.	Number of Persons Licensed to Brew.
1828 - - -	28,441	1831	43,097
1829 - - -	28,594	1832	43,236
1830 - - -	36,550	1833	44,562

11 July 1867.

Thos. Stair, Accountant.

RETURN of the Particulars and Convictions for EVASION of the BEER DUTY during the last Ten Years of its Existence.

There are no books at this office from which the Return can be furnished.

Inland Revenue Office, Somerset House,
23 July 1867.

Fred. Gripper,
Chief Accountant.

AMOUNT of DUTY charged on MALT, BEER, and CIDER.

YEAR.	AMOUNT of DUTY CHARGED.		
	Malt.	Beer.	Cider.
	£.	£.	£.
1826 - - -	4,177,277	3,345,372	28,277
1827 - - -	3,809,998	3,200,902	30,098
1828 - - -	4,731,585	3,294,697	32,802
1829 - - -	3,743,614	2,989,561	27,889
1830 - - -	4,231,997	1,825,972	42,930

Note.—The duty on beer and duty on cider repealed, 10th October 1830.

App. No. 3.

RETURN of the Number of LICENCES issued to BREWERS for each of the Three Years before, and the Three Years after, the Repeal of the Hop Duty.

	Number of Licences issued to Brewers.					
	1859–60.	1860–1.	1861–2.	1862–3.	1863–4.	1864–5.
England and Wales -	39,479	38,838	37,963	37,543	38,653	37,473
Scotland - - -	222	220	219	218	254	262
Ireland - - - -	93	94	94	97	91	88
United Kingdom -	39,794	39,152	38,276	37,858	38,998	37,823

Note.—Hop Duty repealed, 30th September 1861.

Inland Revenue Office,
6 July 1867.

Fred. Gripper,
Chief Accountant.

RETURN of the Quantity of MALT used in DISTILLERIES on which Duty has not been Charged, since it was allowed Duty Free under the Provisions of the Act 18 & 19 Vict. c. 94.

Years ending 31st December	Number of Bushels of Malt used in Distilleries on which Duty has not been Charged.			
	England and Wales.	Scotland.	Ireland.	United Kingdom.
1856 - - - -	442,954	3,294,634	835,933	4,573,521
1857 - - - -	487,841	3,878,329	1,086,078	5,452,248
1858 - - - -	365,132	3,619,486	776,365	4,760,983
1859 - - - -	373,907	3,808,947	695,269	4,878,123
1860 - - - -	351,462	3,443,559	525,529	4,320,550
1861 - - - -	369,667	2,770,704	368,245	3,508,616
1862 - - - -	297,712	3,146,570	394,655	3,838,937
1863 - - - -	322,775	3,951,360	416,829	4,690,964
1864 - - - -	376,982	3,639,493	558,056	4,574,531
1865 - - - -	356,516	3,543,941	596,523	4,496,980
1866 - - - -	395,450	3,654,321	626,334	4,676,105

Inland Revenue Office,
6 July 1867.

Fred. Gripper,
Chief Accountant.

ESTIMATE of the COST of COLLECTING the DUTY on BRITISH SPIRITS, Year ended 31st March 1867,

£.250,000.

Net Revenue, £.10,839,590.
Rate per cent. nearly 2½.

Inland Revenue Office, Somerset House,
9 July 1867.

App. No. 3.

STATEMENT of the Quantity of MALT charged with DUTY, and the Amount of DUTY thereon for the Years 1851, 1852, and 1853, compared with 1854, 1855, and 1856, and 1857, 1858 and 1859.

ENGLAND AND WALES.

YEAR.	Number of Bushels of Malt charged with Duty.	Amount of Duty charged.	Total Number of Bushels of Malt charged with Duty.	Total Amount of Duty charged.
		£.		£.
1851	34,638,214	4,697,807	106,367,684	14,426,115
1852	35,483,623	4,812,466		
1853	36,245,847	4,915,842		
1854	30,576,594	5,960,879	97,593,467	18,297,418
	Stock in hand	881,506		
1855	* 30,702,947	6,140,568		
1856	† 36,313,926	5,314,465		
1857	38,015,619	5,155,868	117,825,729	15,980,113
1858	39,094,653	5,302,212		
1859	40,715,457	5,522,033		

SCOTLAND.

1851	4,102,246	546,723	12,197,866	1,628,221
1852	3,931,790	524,727		
1853	4,163,830	556,771		
1854	3,192,091	611,397	5,945,259	1,132,370
	Stock in hand	35,496		
1855	* 1,630,865	320,568		
1856	† 1,122,303	164,909		
1857	1,313,918	176,007	4,452,298	597,372
1858	1,537,876	206,309		
1859	1,600,504	215,056		

IRELAND.

1851	1,596,956	212,757	4,884,104	651,718
1852	1,657,073	221,302		
1853	1,630,075	217,659		
1854	1,439,878	276,398	4,321,724	796,961
	Stock in hand	35,693		
1855	* 1,190,687	236,475		
1856	† 1,691,159	248,395		
1857	1,834,717	247,737	6,245,262	844,097
1858	2,161,520	292,049		
1859	2,249,025	304,311		

* Since 14th August 1855, malt has been made duty free for distillery purposes under the provisions of the Act 18 & 19 Vict. c. 94.

† Repaid on stock on hand on the reduction of duty		£.
	England	79,234.
	Scotland	17,153.
	Ireland	35,027.

Inland Revenue Office,
6 July 1867.

Fred. Gripper,
Chief Accountant.

App. No. 3.

NUMBER of Bushels of MALT charged with DUTY in the Periods between 16th May and 30th June, both inclusive, in 1866 and 1867.

Rounds ended 30th June.

	1866.	1867.
	Bushels.	*Bushels.*
England - - - - - -	2,065,206	1,024,819
Scotland - - - - - -	292,654	142,202
Ireland - - - - - -	119,311	99,154
United Kingdom - - -	2,477,171	1,266,175

17 June 1867. *Fred. Gripper*, Chief Accountant.

NUMBER of MALTSTERS in the Years 1860, 1861, and 1867.

YEAR.	Number.
1860 - - - - - - - -	6,567
1861 - - - - - - - -	6,545
1867 - - - - - - - -	5,821*

* This is the number licensed for the year ended 30th June 1867, when the licences expire.

Inland Revenue Office,
9 July 1867.

AVERAGE PRICE of MALT for each Year of the last Ten Years.

YEAR.	Price per Quarter.			YEAR.	Price per Quarter.		
	£.	s.	d.		£.	s.	d.
1858 - - - - -	3	3	10¼	1863 - - - - -	3	2	1¾
1859 - - - - -	3	1	9¼	1864 - - - - -	2	18	9¾
1860 - - - - -	3	3	–	1865 - - - - -	2	18	2
1861 - - - - -	3	2	6	1866 - - - - -	3	6	4¾
1862 - - - - -	3	2	9¾	1867 - - - - -	3	9	–½

Inland Revenue Office, Somerset House,
9 July 1867.

ESTIMATED QUANTITY of MALT used Annually by PRIVATE BREWERS.

	Bushels.	*Bushels.*
Taking the last 10 years' consumption of malt, the average for a year, is - - - - - - - - - - -	- -	43,827,082
The quantity used by licensed brewers in a year, taking, as above, the average of the last 10 years, is - - - - -	40,669,897	
The malt exported on drawback, in the last 10 years, gives an average for one year of - - - - - - - -	135,313	
It is estimated that vinegar-makers, yeast-makers, and others, use annually about - - - - - - - - -	300,000	
Making a Total of - - -		41,105,210
And leaving for private brewing, annually, about	- - -	2,721,872

Inland Revenue Office,
9 June 1867.

UNITED KINGDOM.

RETURN of the Number and Particulars of CONVICTIONS of BREWERS and BREWING VICTUALLERS (separately), for Using ILLEGAL INGREDIENTS IN BREWING, during the last Ten Years.

BREWERS.

	Date of Detection.	Amount of Penalty Imposed by Magistrates.	Amount to which Penalty was Mitigated by Board.	Proceedings Stayed on Payment of Compromised Penalty.	Penalty Recovered.	OBSERVATIONS.
		£. s. d.	£. s. d.	£. s. d.	£. s. d.	
ENGLAND - - -	24 April 1857	- -	- -	20 – –	20 – –	Using grains of paradise.
	5 May „	- -	- -	5 – –	5 – –	- - ditto.
	25 May „	- -	- -	50 – –	50 – –	Sulphate of iron found on premises.
	25 Sept. „	50 – –	10 – –	- -	10 – –	Using grains of paradise.
	26 Sept. „	50 – –	10 – –	- -	10 – –	- - ditto.
	6 October „	- -	- -	1 – –	1 – –	Sulphate of iron found on premises.
	22 July 1858	50 – –	15 – –	- -	15 – –	Using grains of paradise.
	20 March 1860	100 – –	20 – –	- -	20 – –	Grains of paradise and cocculus indicus found on premises.
	12 April „	50 – –	15 – –	- -	15 – –	- - ditto.
	21 April „	50 – –	25 – –	- -	25 – –	- - ditto.
	15 Nov. „	- -	- -	400 – –	400 – –	Molasses found on premises.
	22 Nov. „	- -	- -	20 – –	20 – –	- - ditto.
	29 Nov. „	100 – –	- -	- -	100 – –	- - ditto.
	12 Feb. 1861	100 – –	- -	- -	100 – –	Bastard sugar found on premises.
	22 March „	- -	- -	5 – –	5 – –	Using horehound.
	23 April „	- -	- -	5 – –	5 – –	Juniper berries and orange berries found on premises.
	12 March 1863	- -	- -	7 – –	7 – –	Using grains of paradise.
	24 March „	- -	- -	50 – –	50 – –	Using grains of paradise and cocculus indicus.
	22 April „	- -	- -	15 – –	15 – –	Using grains of paradise.
	24 April „	- -	- -	5 – –	5 – –	- - ditto.
	6 August „	- -	- -	5 – –	5 – –	- - ditto.
	27 August „	- -	- -	10 – –	10 – –	Capsicums and copperas found on premises.
	17 Sept. „	- -	- -	15 – –	15 – –	Using grains of paradise.
	21 Nov. „	- -	- -	5 – –	5 – –	- - ditto.
	20 January 1864	- -	- -	5 – –	5 – –	- - ditto.
	11 March „	- -	- -	5 – –	5 – –	- - ditto.
	12 March „	- -	- -	5 – –	5 – –	- - ditto.
	2 May „	- -	- -	20 – –	20 – –	- - ditto.
	6 May „	- -	- -	5 – –	5 – –	- - ditto.
	11 August „	- -	- -	10 – –	10 – –	- - ditto.
	8 October „	- -	- -	5 – –	5 – –	- - ditto.
	5 Feb. 1866	50 – –	25 – –	- -	25 – –	Using molasses.
	9 March „	- -	- -	2 – –	2 – –	Using grains of paradise.
	1 Nov. „	50 – –	5 – –	- -	5 – –	Treacle found on premises.
SCOTLAND - - -	17 March 1857	- -	- -	10 – –	10 – –	Using calamas root.
	11 January 1861	100 – –	- -	- -	100 – –	Using bastard sugar.
	15 January „	- -	- -	50 – –	50 – –	- - ditto.
	9 March „	- -	- -	10 – –	10 – –	- - ditto.
IRELAND - - -	11 October 1858	50 – –	25 – –	- -	25 – –	Syrup found on premises.

BREWING VICTUALLERS.

ENGLAND - - -	25 June 1857	- -	- -	2 – –	2 – –	Using grains of paradise.
	10 July „	- -	- -	2 – –	2 – –	- - ditto.
	16 Sept. „	50 – –	10 – –	- -	10 – –	- - ditto.
	12 Nov. „	- -	- -	10 – –	10 – –	- - ditto.
	16 Dec. „	50 – –	5 – –	- -	5 – –	- - ditto.
	20 Feb. 1858	- -	- -	5 – –	5 – –	- - ditto.
	23 Feb. „	- -	- -	5 – –	5 – –	- - ditto.
	17 March „	- -	- -	5 – –	5 – –	- - ditto.
	20 May „	- -	- -	5 – –	5 – –	- - ditto.
	25 May „	- -	- -	5 – –	5 – –	- - ditto.
	2 June „	- -	- -	5 – –	5 – –	- - ditto.
	28 August „	50 – –	10 – –	- -	10 – –	- - ditto.
	20 Sept. „	50 – –	15 – –	- -	15 – –	- - ditto.
	27 October „	- -	- -	5 – –	5 – –	- - ditto.
	27 October „	50 – –	5 – –	- -	5 – –	- - ditto.
	28 October „	- -	- -	5 – –	5 – –	- - ditto.
	9 Dec. „	- -	- -	10 – –	10 – –	- - ditto.
	17 Dec. „	- -	- -	20 – –	20 – –	Using chicory and mangold wurzel.
	7 Feb. 1859	50 – –	10 – –	- -	10 – –	Using grains of paradise.
	23 March „	- -	- -	5 – –	5 – –	- - ditto.
	12 July „	- -	- -	5 – –	5 – –	- - ditto.

RETURN of the Number and Particulars of Convictions of Brewers and Brewing Victuallers (separately), &c.—*continued.*

BREWING VICTUALLERS—*continued.*

——	Date of Detection.	Amount of Penalty Imposed by Magistrates.	Amount to which Penalty was Mitigated by Board.	Proceedings Stayed on Payment of Compromised Penalty.	Penalty Recovered.	OBSERVATIONS.
		£. s. d.	£. s. d.	£. s. d.	£. s. d.	
ENGLAND—*continued* -	9 August 1859	50 – –	15 – –	- -	15 – –	Using chicory.
	12 August „	50 – –	15 – –	- -	15 – –	Using calamus aromaticus.
	3 Sept. „	50 – –	25 – –	- -	25 – –	Using grains of paradise.
	30 March 1860	50 – –	25 – –	- -	25 – –	- - ditto.
	5 April „	50 – –	15 – –	- -	15 – –	- - ditto.
	7 April „	50 – –	15 – –	- -	15 – –	- - ditto.
	7 April „	50 – –	25 – –	- -	25 – –	- - ditto.
	7 April „	50 – –	15 – –	- -	15 – –	- - ditto.
	16 April „	50 – –	25 – –	- -	25 – –	- - ditto.
	18 April „	50 – –	20 – –	- -	20 – –	- - ditto.
	18 April „	50 – –	25 – –	- -	25 – –	- - ditto.
	5 May „	50 – –	35 – –	- -	35 – –	- - ditto.
	16 May „	75 – –	15 – –	- -	15 – –	Using grains of paradise and cocculus indicus.
	21 May „	50 – –	30 – –	- -	30 – –	Using grains of paradise.
	21 May „	50 – –	15 – –	- -	15 – –	- - ditto.
	21 May „	50 – –	10 – –	- -	10 – –	- - ditto.
	4 July „	- -	- -	5 – –	5 – –	- - ditto.
	4 July „	- -	- -	2 – –	2 – –	Using grains of paradise and cocculus indicus.
	24 Sept. „	100 – –	12 10 –	- -	Imprisoned	Using grains of paradise.
	19 January 1861	50 – –	25 – –	- -	25 – –	Using liquorice, ginger, and sweet flag-root.
	6 March „	50 – –	10 – –	- -	10 – –	Using grains of paradise.
	13 March „	50 – –	10 – –	- -	10 – –	- - ditto.
	24 April „	50 – –	25 – –	- -	25 – –	Camomile flowers and gentian found on premises.
	3 June „	- -	- -	5 – –	5 – –	Using grains of paradise.
	3 June „	150 – –	15 – –	- -	15 – –	- - ditto.
	17 April 1862	100 – –	25 – –	- -	25 – –	- - ditto.
	30 April „	100 – –	25 – –	- -	25 – –	Using treacle.
	15 Feb. 1864	- -	- -	10 – –	10 – –	Using grains of paradise.
	15 Feb. „	- -	- -	10 – –	10 – –	Treacle found on premises.
	27 Feb. „	- -	- -	5 – –	5 – –	Using grains of paradise.
	12 March „	- -	- -	10 – –	10 – –	- - ditto.
	19 March „	50 – –	2 10 –	- -	2 10 –	- - ditto.
	19 March „	50 – –	5 – –	- -	5 – –	- - ditto.
	30 March „	- -	- -	1 – –	1 – –	- - ditto.
	12 April „	- -	- -	5 – –	5 – –	- - ditto.
	5 May „	- -	- -	5 – –	5 – –	- - ditto.
	2 Sept. „	- -	- -	10 – –	10 – –	- - ditto.
	7 Sept. „	- -	- -	10 – –	10 – –	- - ditto.
	23 Sept. „	- -	- -	10 – –	10 – –	- - ditto.
	30 Sept. „	50 – –	10 – –	- -	10 – –	- - ditto.
	17 Nov. „	- -	- -	2 – –	2 – –	- - ditto.
	17 Nov. 1865	- -	- -	50 – –	50 – –	- - ditto.
	13 Dec. „	50 – –	- -	- -	Absconded	- - ditto.
	22 Dec. „	50 – –	10 – –	- -	10 – –	- - ditto.
	3 Feb. 1866	50 – –	12 10 –	- -	12 10 –	- - ditto.
	3 Feb. „	50 – –	5 – –	- -	5 – –	- - ditto.
SCOTLAND - - -	No Convictions against Brewing Victuallers.					
IRELAND - - -	- - ditto.					

NUMBER OF CONVICTIONS.

——	Brewers.	Brewing Victuallers.	TOTAL.
ENGLAND - - - - - - -	34	67	101
SCOTLAND - - - - - - -	4	- nil -	4
IRELAND - - - - - - -	1	- nil -	1
TOTAL - - -	39	67	106

Inland Revenue Office,
23 July 1867.

Fred. Gripper, Chief Accountant.

App. No. 3.

DUTY ON MALT IMPORTED.

IN fixing the duty on Foreign malt imported at 25 *s.* a quarter, 1 *s.* was assumed to cover the duty charged on Foreign Barley on importation.

As the foreigner can store his malt in bond after importation until it is wanted for use, while the British maltster is required to pay the duty shortly after the malt is made, the interest on the duty locked up was taken at about another 1 *s.* a quarter.

The cost of excise restrictions was taken on a liberal computation, at about 1 *s.* 3½ *d.*, making a total of 3 *s.* 3½ *d.*, the difference between the duty on a quarter of British made malt, and on that quantity when imported.

Inland Revenue Office, Somerset House,
7 June 1867.

STATISTICS of the Production of BEER in *Prussia, Bavaria,* and *Wurtemburg.*

PRUSSIA.

YEARS.	Number of Breweries.	Amount of Malt Tax Levied (2 *s.* –⅖ *d.* per Cwt.)	Quantity of Malt upon which the Malt Tax was Levied.	Total Number of Gallons of Beer Produced.	Quantity of Beer Produced per Head of Population.
		£.	*Cwt.*	*Gallons.*	*Gallons.*
1860 - - - -	7,649	198,649	1,951,017	49,662,250	2·6
1861 - - - -	7,530	207,404	2,037,001	51,850,950	2·8
1862 - - - -	7,442	221,431	2,174,767	55,357,725	3·0
1863 - - - -	7,359	244,383	2,400,197	61,095,925	3·3

BAVARIA.

YEAR.	Number of Breweries.	Quantity of Malt upon which the Malt Tax was Levied.	Total Number of Gallons of Beer Produced.	Quantity of Beer Produced per Head of Population.
		Bushels.	*Gallons.*	*Gallons.*
1861 - - - - - -	5,385	9,787,200	168,000,000	36

WURTEMBURG.

YEARS.	Quantity of Malt charged with Duty.	Total Number of Gallons of Beer Produced.	Quantity of Beer Produced per Head of Population.
	Bushels.	*Gallons.*	*Gallons.*
1859–60 - - - - - - -	1,872,605	44,378,555	26
1860–61 - - - - - - -	1,461,810	34,643,180	20
1861–62 - - - - - - -	2,006,163	47,543,730	28
1862–63 - - - - - - -	2,200,012	52,137,735	30
1863–64 - - - - - - -	2,367,697	56,111,705	32

Statistical Department, Board of Trade,
11 July 1867.

App. No. 3.

Inland Revenue Office, 13 July 1867.

MEMORIALS received from MALTSTERS during the last Five Years, complaining of Excise Regulations, or suggesting Alterations to facilitate Business, that have not been complied with.

Messrs. ARNOLD & Co., maltsters and brewers, of Wickwar, by letter of 6th December 1862, asked permission to steep and grow light barley for their horses.

They were informed that no objection would be made to their steeping small quantities of barley for use of their horses, but they would not be allowed to germinate it, as the fact of its growing would bring it within the designation of malt, and render them liable to penalties.

OVERTON, PAINTER & Co., of Wrexham, maltsters, 8th December 1862, requested to be allowed to drain off the water from cistern at the expiration of 44 hours, instead of keeping it covered 50 hours (as they are required to do, when they wish to sprinkle on the floor before the expiration of 12 days), on the ground of the wet summer having rendered the barley soft.

These maltsters had been in the practice of draining the water from the grain in steep at the end of 50 hours, and of sprinkling it on the floor on the expiration of four, five, or six days.

The law requires grain to be kept under water at least 50 hours if the maltsters desire to sprinkle it on the floor on the expiration of four days. If they drain before the expiration of 50 hours, it is on the condition that the grain must not be sprinkled on the floor until the end of 12 days.

The request was not granted, on the grounds that the grain of the harvest referred to did not require the indulgence, which was confirmed by the fact that no other maltster had made a similar request; that the grain in general was working well, and that to grant such an indulgence unnecessarily would diminish the revenue, and give opportunities for fraud.

Mr. CHARLES GARDINER, a maltster, in Gloucester district, by letter, dated 4th November 1863, asked to be allowed to empty grain from cistern in two houses having internal communication, on different days, his plea being scarcity of water.

The law requires that all grain steeped in houses having internal communication shall be emptied on the same day within the prescribed hours.

Under very peculiar circumstances, such as deficiency of water, the Board has in one or two instances, permitted the grain from two cisterns under the same roof, or in houses communicating internally, to be emptied on different days; but as in this case the malthouses were newly erected, and the proximity of the cisterns and working-floors to each other would afford great facilities for fraud, it was considered that the law could not with safety be relaxed.

Messrs. J. & G. PENDREIGH, maltsters at Leith, by letter dated 20th November 1863, requested permission to dry malt in a kiln at another malthouse, situated about a quarter of a mile from the house in which the malt is made.

It was reported that although the law does not actually state that a malt kiln must be on the malting premises, or indeed that malt must be dried at all, it is made penal to remove malt from the building or place wherein it is made until it is taken account of, and charged with duty; and as malt is liable to surcharge until it is fully dried, and is liable to seizure if found removing undried, as being goods in course of manufacture subject to duty, and in an unentered place, the law appears sufficient to prevent a kiln being made use of at so great a distance from the malthouse.

It would be attended with so much risk and inconvenience to allow malt to be removed in a green state, that this was considered to be a case which could not be favourably entertained, and the request of the maltsters was not complied with.

THOMAS POOL, of Braintree, maltster, applied 10th January 1865, to be allowed to steep grain more than 40 inches in depth.

The cistern is 52 inches in depth, but was constructed and in use prior to 2nd July 1827, when, by the passing of the Act 7 & 8 Geo. 4, c. 52, maltsters were restricted to 40 inches in the depth of cisterns; but such as were constructed and in use at that time were allowed to be used under certain conditions. Mr. Pool was allowed to use, and has continued to use the one in question, under the condition that the depth of grain therein should not exceed 40 inches. His present application to be allowed to use it without the condition was not complied with, in consequence of the great difficulty in taking account of grain in steep, if of greater depth.

JOSEPH WILSON, of Elland, maltster, by letter dated 21st September 1865, requested permission to increase the depth of a malt cistern from 40 to 50 inches, on the ground of his having sufficient floor and kiln room to work a larger quantity than his cistern would steep, and that his maltman was not fully employed.

Before the year 1827 the law placed no limit to the depth of cisterns; but in consequence of the

App. No. 3.

the erection of cisterns of great depth, considerable difficulty and uncertainty was experienced in taking a proper account of the corn in steep. The Act 7 & 8 Geo. 4, c. 52, passed in 1827, required that no cistern should be constructed of greater depth than 40 inches.

The request to deepen the cistern was not granted, as the cistern which was then legal would become, by the alteration, illegal; and the reasons for the request did not appear sufficiently pressing.

The attention of the Board of Inland Revenue having been called to a letter in the "Mark Lane Express," of 25th September 1865, from Mr. Isaac Seaman, of Saffron Walden, on the subject of saccharizing grain for cattle-feeding purposes, and as that letter contained statements respecting the application of the Excise laws to the process therein described, which were at variance with the provisions of the laws as regards malting, and were calculated to mislead the public, the Board considered it advisable to apprise Mr. Seaman of those provisions, and of the manner in which they would affect persons who might be induced to follow the practice in question.

Mr. Seaman afterwards applied to the then Chancellor of the Exchequer, and the paper having been referred to the Board, a memorandum to the following effect was sent in:—

> "The practice of steeping grain, to prepare it as food for cattle, prevailed to some extent as far back as 1835, and although it was felt to be attended with considerable risk to the Revenue, we instructed our officers, by orders dated in 1835 and 1836, to abstain from any interference with the practice, unless in case of actual or suspected fraud."

These orders, however, only applied to steeped grain, not to such grain as might undergo a process of germination, and which would thereby have become malt to all legal intents and purposes, and capable of being used as such to the great detriment of the malt revenue and the fair trader. The article which Mr. Seaman wishes to introduce is in fact malt. After kiln-drying, it could be used in brewing beer; and to allow the grain to be steeped as proposed in farmhouses all over the country, would entail the very greatest risk of its being afterwards worked off at any convenient malt or corn kiln, or large oven, and sent into consumption without payment of duty. Great facilities would also be thus afforded for illicit distillation.

Since the passing of the Act 27 Vict. c. 9, in April 1864, which legalised the malting of grain by licensed maltsters duty free for cattle-feeding, the occasion for sanctioning such a proposition as Mr. Seaman's is greatly diminished. It is true that the law imposes restrictions with a view to securing the revenue on duty-paying malt, and that the price of the legal malt for cattle-feeding, which is mixed with linseed, must be considerably enhanced thereby, but we are not aware that those restrictions could be safely diminished.

Messrs. Bass & Co., maltsters, of Burton-on-Trent, on 1st January 1866, complained that they are charged with duty in excess of the quantity of barley made into malt, the statutory allowance being insufficient on barley steeped, as in their case, 60 or 70 hours.

The following is given by them as the result of the previous two seasons' charges:—

		£.	s.	d.
Malt Duty, Seasons 1863, 1864:				
102,822 6/8 qrs. barley, steeped, paid duty	-	114,336	12	5¼
21 *s.* 8¼ *d.* per qr. on 102,822 6/8 qrs., is -	-	111,562	13	7
	£.	2,783	18	10
		sic		
Season 1864–65:				
124,604 5/8 qrs. barley, steeped, paid duty	-	138,719	19	3
21 *s.* 8¼ *d.* per qr. on 124,604 5/8 qrs, is -	-	135,196	–	4
	£.	3,523	18	11

The following is a copy of the report to the Treasury by the Board of Inland Revenue:—

"6 April 1866.

"May it please your Lordships,

"In returning the annexed letter from Messrs. Bass & Co., of Burton-on-Trent, enclosing copy of their correspondence with this Board upon the subject of alleged overcharges of malt duty paid by them in consequence of what they term 'the erroneous system of gauging and allowances in the process of malting' adopted by this department,—

"We report that the mode of calculating the duty upon malt, fixed by the Act 1st Vict. c. 49, is precise and clear, and must have been settled by the Legislature with a full knowledge of the proportions of malt that would be produced from a given quantity of barley, and it would be very difficult, if not impossible, under the present system of charging the malt duties upon the quantity of malt produced, to fix upon any scale of allowances that would compensate, in such case, for the unequal results which must take place in the manufacture of malt.

"Messrs. Bass & Co. do not allege that they have paid duty on a larger quantity of malt than was actually produced from the barley steeped by them, and we feel quite sure that they could not venture upon any such assertion; but they appear to assume that the maltster ought not, according to the meaning of the law, to be charged with duty upon any quantity of malt exceeding the quantity of dry barley steeped.

"This view of the principle upon which the charge of duty is imposed is founded on a misconception, and is contrary to the opinion held by the trade themselves upon the subject as long ago as the year 1829, when the committee of the Maltsters' Association, representing above 1,800 maltsters, 'agreed that the law, from first to last, had made and declared the charge a malt duty, and decided upon supporting the principle of a malt charge, and not a charge upon the dry barley.'

"As respects the allowance, we have to state, that for many years prior to the year 1830, it was 20 per cent. upon the gross charge taken in the cistern or couch; but in that year it was reduced to 17½ per cent., and remained at that rate until 1837, when it was increased to 18½ per cent. at which it still remains.

"Upon this point it may be desirable to refer to the evidence of Mr. Gibson, a prominent maltster, who was examined before the Parliamentary Commission of Excise Inquiry in 1835, when the allowance was only 17½ per cent.; Mr. Gibson says, in effect,

"'When the allowance was 20 per cent. it was considered by the traders that it was rather too much, and that it opened a door for fraud; but a calculation had been made by the trade, and it was found that if the allowance were reduced from 20 to 18 per cent., the maltsters would have no reason to complain, and it would operate very much against the fraudulent trader introducing uncharged corn amongst the malt in operation.'

"Other maltsters agreed with Mr. Gibson as to the sufficiency of 18 per cent., but an allowance of 18½ per cent. was ultimately adopted, as we have stated, in 1837.

"The principal ground upon which Messrs. Bass & Co.'s complaint really rests is, that as they find it desirable to steep their barley from 60 to 70 hours, the additional bulk of the malt caused by the protracted steeping, increases the charge of duty beyond the amount which would be payable if they steeped for only 40 hours, the minimum time required by law, and in respect of which the allowance was adjusted.

"It is certainly true, that barley in steep, continues to increase in bulk, more or less, according to its quality, or degree of dryness when put in steep, up to 50, 60, or even 70 hours, but we believe that the allowance of 18½ per cent. is amply sufficient in all cases to keep the duty charge below the actual quantity of malt produced, and that it would be impracticable, as we have already stated, to adopt a scale of allowances to meet the unequal results which must take place in the manufacture of malt under all circumstances.

"We may add, as regards the memorialists, that the barley malted by them is of the best quality, and that although it is liable to a higher charge on account of the length of time that it is kept in steep, it produces a greater quantity of dry malt than would be obtained from a like quantity of barley of inferior quality, and thus compensates them for the additional charge of which they complain.

"In view of the foregoing facts we cannot admit that Messrs. Bass & Co. have any substantial ground of complaint as regards the malt duty charged at their premises."

Messrs. Hope & Co., of Dunbar, state by letter, dated 14th May 1866, that they work five malthouses which have but two kilns common to all the houses. Nos. 1, 2, 3, and 4 houses are under one roof, but there is no internal communication between houses 1 and 2, and houses 3 and 4, except through the kilns.

The traders ask permission to empty grain from the cisterns in different days, in order that the floors of malt may be ready for drying at an equal age.

No reasons were given for this request beyond the insufficient drying power of the kilns, and as an additional kiln could be erected at an inconsiderable expense, while the revenue would be exposed to risk if the law were relaxed, it was not thought advisable to grant the traders' request.

Alexander Young, Bocking, Braintree, in May 1866, complaining of the operation of the Act allowing malt duty to be charged by weight, and suggesting alteration of standard to 50 lbs.

Copy of Report to Treasury.

"May it please your Lordships,

"In returning the annexed letter, addressed to the Chancellor of the Exchequer by Mr. Alexander Young, of Bocking, Braintree, complaining of the operation of the Act of last Session, 28 & 29 Vict. c. 66, 'allowing the charging of the excise duty on malt, according to the weight of the grain used;' and suggesting with reference to the 7th section of the Act, that 50 lbs. be substituted for 53 lbs. as the standard weight of a bushel of malt.

"We report as regards the first objection urged against the Act by Mr. Young, that in cases where the supply of water is not sufficient to enable a maltster to cover the grain in the cistern within the three hours prescribed by law for that purpose, the difficulty is generally obviated at a trifling cost by providing a tank or cask, and collecting a sufficient quantity of water therein, before the day of steeping.

"With respect to the working of the Act, we may observe that the experience of the one season, and that an exceptional one, during which it has been in operation, does not enable us to draw any conclusions as to whether or not it will be found to answer the purpose of those for whose benefit the change in the law was made.

"Up to the present time only a small proportion of the general body of maltsters have availed themselves of it; but this has arisen, principally we believe, from the fact that the weight of the barley used has generally approached nearly to, or has exceeded the standard weight of 53 lbs. to the bushel.

"We have only to add that the reduction of that standard as proposed would render the Act almost inoperative, and would afford reasonable ground of complaint on the part of the growers of the lighter description of barley, in whose interests the Act was passed."

Mr. Sidney Stanbridge, of Wandsworth, maltster, by letter dated 12th July 1866, requested permission to steep barley for malting, during hot weather, a shorter time than required by law, on the following grounds:—

The barley when the season is far advanced, is too old to grow well; the water used for steeping is so hot that the barley is decomposed before it can be emptied from the cistern; and the barley has afterwards to be kept so long in couch frame, that it becomes heated, and its growing properties destroyed.

The request was not complied with, because experience has proved that it is practicable to make malt of fair quality at any season of the year without shortening the time for keeping the barley in steep in cistern, and if the water be drained from the cistern, as is usual, about the middle of the steeping, the temperature will not rise so high as to injuriously affect the vegetative quality of the barley.

As maltsters may now empty grain from their couch frames at the end of 20 hours, instead of 26 hours, as formerly, it is not considered that the malt is likely to be injured by heating while in the frame.

To shorten the time that grain must be kept in steep would reduce the charge for duty below the proper

App. No. 3. proper amount, as the allowance for increase in cistern is computed on the supposition that the grain is covered with water at least 40 hours.

The Revenue would therefore be injuriously affected if the request were granted.

HENRY PAGE, maltster, at Ware, by letter dated 21st April 1867, asked to be allowed to remove grain from the couch-frame, at the end of 12 hours instead of 20, provided the supervisor had had a check-gauge, and assigned as his reason for asking, that the warm weather forces vegetation, and injures the quality of the malt.

This statement was not borne out, however, by the observations of the surveying officers, who found that the maltman deferred removing the grain until after 24 hours, although he might legally have done so after 20 hours.

If this request were conceded, the supervisor would have a very limited time for checking the officers' charges, and in many districts it would be impracticable at malt-houses not in or near the supervisor's residence; and those maltsters who must keep the grain in couch 20 hours, would labour under a disadvantage, as compared with those in the supervisor's residence, which would give rise to complaints.

The reason for this application was probably to avoid the increased charge that often arose by the swelling of the grain in warm weather. Such increase is not now charged with duty.

MEMORIAL of the SCOTCH MALT DISTILLERS and others to the Right Honourable *W. E. Gladstone*, Chancellor of the Exchequer.

To the Right Honourable W. E. Gladstone, the Chancellor of Her Majesty's Exchequer.

Sir, London, 14 February 1866.

THE memorial of the undersigned, being Scotch Malt Distillers, and a deputation representing the whole of the Patent Still Grain Distillers of Scotland and Ireland, and a section of the English Distillers, humbly showeth, that they are carrying on the business of manufacturing spirits under circumstances which bid fair to drive the spirit trade out of their hands:

Firstly. Because they are exposed to a violent competition from spirits manufactured from roots in Germany (where the process is conducted by the farmers in conjunction with cattle-feeding, practically free from all excise regulations), imported into the United Kingdom under a system which amounts to a bounty from the Prussian Government.

Secondly. Because distillation from roots is practically prohibited in Great Britain, from its being wholly inconsistent with and unsuited to the genius of the laws of Excise in Great Britain, which laws are extremely strict and complicated, to ensure the efficient collection of the highest rate of duty ever levied on British spirits, viz., about 700 per cent., on the average price of the article.

Thirdly. The present differential duty on foreign spirits of 5 *d.* per gallon is not an equivalent for the duty on foreign grain, excise restrictions on the British distiller, and the difference in the mode of assessing the duty on British and foreign spirits.

Fourthly. The following is the comparative position of the British and foreign producers of spirits as regards spirits entered for home consumption in the United Kingdom:—

	Amount now Claimed, and composed of the following Items. Per Proof Gallon.	Amount allowed by the Excise in 1860, but then considered inadequate by the Distillers. Per Proof Gallon.
	d.	*d.*
1st. Compensation for duty on foreign grain	- ¾	- ¾
2nd. Prohibition against brewing and distilling at same time	1½	1
3rd. Against distillers mixing wort in separate vessels while in process of fermentation	- ¼	- ¼
4th. Loss of duty on rectification, and flavouring spirits in separate premises	3	1
5th. Colouring matter in foreign spirits	2	2
6th. Increased expense in making malt from Excise fetters on the process	- ¼	–
7th. Difference in mode of charging duty in favour of foreign spirits	1	–
8th. Duty evaded upon foreign spirits, and by samples drawn in bond	- ¼	–
	9	5
Deduct, as per other side	5	–

Disadvantage to British distiller in home market - - - - - - - - - 4 *d.* per proof gallon.

being 20 per cent. on the present selling price of British-made grain spirits in the London market.

From

App. No. 3.

From the foregoing statement, it is evident that the British distiller cannot, under existing Governmental arrangements, continue to hold his position in the British spirit market, and far less so in the export trade. Your memorialists would therefore urge the immediate necessity of removing the anomalies of a native production being more heavily burdened than a similar commodity imported from foreign countries, and the British distiller compelled to compete with a spirit manufactured from roots, which fiscal regulations wholly disable him from producing profitably.

Your memorialists are also most desirous of having the Distillery Laws altered, whereby they may be allowed the option of sending out a portion of their wort as beer, upon payment of a duty on such wort, corresponding to, and as an equivalent for, the malt duty and commutation hop duty now paid by brewers.

Your memorialists are satisfied that such a change of the Distillery Laws will enable them to turn the brewing plant of their distillery premises to profitable account at times when the Excise statutes now compel them to keep this plant idle. Such a relaxation will materially cheapen the price of beer to the consumer, by bringing into use an additional number of cheap substances (now excluded from breweries by the incidence of the Malt Duty) which are available for the manufacture of fresh wholesome beer, and, in the opinion of your memorialists, it will in no way damage the revenue derived from malt or spirits, or create any additional expense for officers of Excise to survey distilleries.

(signed) *John Haig*, Cameronbridge.
Graham Menzies, Caledonian Distillery, Edinburgh.
John A. Haig, Dundalk Distillery, Ireland.
Robert Mowbray, Cambus.
Alexander M^cNab, Glenochil Distillery.
James Grant, of the Glen Grant Distillery, and Deputy for the Distillers of the Elgin Collection.
Robert Stewart, Kirkliston Distillery, Linlithgowshire.

EXTRACT from Report of Commissioners of Inland Revenue to the Lords Commissioners of Her Majesty's Treasury on the above Memorial, so far as relates to the Brewing of Beer by Distillers:

"With respect to the request of the Scotch memorialists for an alteration of the law, for the purpose of enabling them to send out a portion of the worts from their distilleries as beer, we need only remark that it would be necessary in the first instance to repeal the malt duty, in order to place brewers and distillers on an equal footing in brewing beer; as distillers could, if this request were complied with, make beer from raw grain, molasses, and other materials, which brewers are prohibited from using.

"But, under any circumstances, such a measure would be objectionable, as affording facilities for fraud, which it would be impossible to prevent, except by the adoption of more numerous and more stringent restrictions than already exist in distilleries."

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TO THE

REPORT

FROM THE

SELECT COMMITTEE

ON

MALT TAX.

Ordered, by the House of Commons, *to be Printed*,
25 *July* 1867.

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Particulars as to the quality, quantity, and cost of the beer supplied by witness to his men; unlimited supply of small beer in lieu of 1 *s.* a week in wages, 1889–1897. 1909, 1910. 1971–1975——Calculation as to the extent to which the malt duty is a tax upon witness's farm in respect of the beer required for consumption by his men, 1898–1902——Effect of the tax in causing a monopoly in the case both of maltsters and of brewers, 1903–1905.

Explanation in connection with the supply of beer to some of witness's men direct from the brewer; its price and quality as compared with that brewed by witness, 1908. 2014–2024. 2048–2051——Increased growth of barley by witness but for the duty, 1911–1913——Enhanced value of the produce of pasture land as compared with arable land, so that some of the poorer arable lands have of late years been turned into pasture; disadvantage thereby to the community at large, 1914–1924. 1986–2013. 2054–2058. 2086–2090.

Statement as to its depending entirely upon the relative supply and demand in any year whether the cultivation of barley is profitable or otherwise, 1943–1949——Further evidence as to the undue pressure of the tax upon maltsters and, through them, upon the growers, 1949–1968——Reason for the brewer being well contented with the present system, as he is practically working with the Government money, 1951–1953. 1963, 1964——Advantage in growing barley, on the four-course system, on light land rather than heavy land, 2010–2012——Increased growth of barley on heavy soils if the duty were removed, the demand being sure to increase in consequence, 2063–2077.

COLLECTION AND COST OF COLLECTION:

Collection of the malt duty half quarterly, *Stephenson* 30——Estimate of three per cent., or 1 *d.* per bushel, as the cost of collecting the malt tax, *ib.* 60, 61. 97–99——Comparative economy in collection, *ib.* 62, 63——Varying lapse of time after the malting process when the duty is collected, *ib.* 72, 73.

Various modes of employment of the Excise officers when not busy in collecting the malt tax, *Stephenson* 86–90——Satisfactory working of the tax at the present time, the consumption of malt being rapidly increasing, and the collection being easy and inexpensive, *ib.* 129–133. 165, 166——Total of about 180,000 *l.* as the annual cost of collection of the malt duty, *ib.* 170, 171——Restrictions imposed as to the mode of construction of malt-houses and the hours of steeping the barley, *ib.* 174, 175——In calculating

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Grounds for the conclusion that the saving would be immense in collecting a beer tax in lieu of the malt tax, *Cayley* 2305. 2308 *et seq.*——Difficulty in finding any tax so expensive to collect as the malt tax, *ib.* 2392–2394.

Estimate of about 2½ per cent. as the cost of collecting the duty upon British spirits for the year ended 31st March 1867, *App.* 151.

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Consumption of Malt and Beer. See *Barley.* *Beer.* *Malt.*

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Very limited extent to which any malting and brewing are now carried on by cottagers, *Carling* 656–660. 666, 667.

Opinion as to the capabilities of labourers for brewing at home if supplied with malt, there being no duty; advantage to their families by doing so, *Randall* 973–979. 1030. 1038, 1039. 1073–1094——Very few agricultural labourers in the district about Ipswich who brew for themselves throughout the year, *Everett* 1343——Great benefit to labourers and their families if they had facilities for brewing at home, without being subject to malt duty or beer duty; prevention thereby of the evils arising from frequent resort to public houses, *ib.* 1344–1349. 1355. 1384–1420. 1465–1502. 1537–1541. 1548–1551——Examination upon the question whether it is desirable to encourage home brewing by cottagers, instead of an increased consumption of tea, coffee, &c.; conclusion as to the necessity of supplies of beer for labourers, *ib.* 1384–1420. 1426–1429. 1463–1502. 1551.

Exceptional instances of the labourers in witness's district brewing their beer; tendency of a repeal of the malt tax to increase the practice, *Clayden* 1783–1786. 1805, 1806. 1810. 1848——Great boon to the labourers and their families if the malt tax were repealed, and if cottage brewing became general, as would probably be the case, *Ellman* 2170–2174.

Expectation that cottage brewing would in time become very general if the malt tax were removed, and that great benefit would arise thereby to labourers and their families, *Cayley* 2301–2303. 2429–2431. 2494–2497, 2540–2545——Great facility with which brewing can be carried on; simple appliances sufficient for the purpose, *ib.* 2302. 2473, 2474——Statement as to the low price at which cottagers might brew excellent beer but for the malt tax, *ib.* 2424–2431. 2476–2478. 2494–2497——Obstacles to cottagers brewing their own beer at present, whereas if the tax were removed they would not only brew, but would malt their own barley, *ib.* 2494–2497. 2540–2567.

Belief further expressed that the removal of the tax would greatly stimulate cottage brewing, *Cayley* 2557–2567——Cessation of home brewing many years ago when a tax was put on private malting, *ib.* 2558. 2561, 2562——Suggestion that persons below the class qualified as voters for boroughs and counties might be allowed to brew duty free, *ib.* 2579–2582——Probability of an unduly high price being paid for malt by cottagers who buy it retail, *ib.* 2587——General practice of cottage brewing before the permission to malt for private consumption ceased in 1783, *ib.* 2588.

Opinion that if the malt tax were removed brewing would be extensively carried on both by farmers and cottagers in Hertfordshire, *Lattimore* 2658–2660——Opinion that a repeal of the malt tax would not lead to much cottage brewing in witness's district, *Pell* 3066, 3067. 3095. 3160–3165——Practice of witness's labourers to brew for themselves in hay and harvest time, the malt for the purpose being bought by them through witness, *Biddell* 3330–3339——Conclusion that if the malt tax were repealed cottage brewing would be very general throughout Suffolk all the year round, whilst the advantage to the labouring classes on the score of quality and price, as compared with public-house beer, would be very considerable, *ib.* 3340–3344. 3336–3406——Cottage brewing is now very general in Suffolk for part of the year, *ib.* 3356. 3380–3382.

Facility of cottage brewing as regards the plant and appliances necessary, *Biddell* 3360, 3361. 3487–3493——Statement as to the cost of the beer brewed by witness and the cost at which the cottagers can brew, *ib.* 3362–3366. 3375–3379——Explanation as to cottage brewing in Suffolk not being general all the year round, notwithstanding the saving

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saving to be effected; obstacle through the necessary outlay for malt, *Biddell* 3383–3406 ——Contemplated exemption of cottage brewers from a beer tax; that is, if they brewed only a bushel at a time, *ib.* 3407–3417. 3463–3467. 3505–3507——Justification of cottage brewing free from duty, even though it would injure the public-houses, *ib.* 3494–3499.

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Credit (*Payment of Tax*). Large increase of revenue from the duty in 1860, on account of the credits having been shortened in that year, *Stephenson* 18——Extent of credit before payment after each account is made up; increased credit obtainable if the maltster gives a bond, *ib.* 31, 32——Satisfactory working of the system of bonds, *ib.* 69, 70.

Statement that the reduction of malt houses was not caused by the short credits, *Carling* 405–407. 420. 435——Explanation of the former and present arrangements in regard to malt credits and the giving of bonds, *ib.* 407–416.

Crimean War. Reduced consumption of malt when the tax was raised during the Crimean war, whereas the consumption of beer continued the same; inference as to adulteration having been resorted to *Everett* 1209–1211. 1433, 1434. 1440, 1441——Instance, at the time of the Russian war, of the effect of an increase of the tax in adding unduly to the cost price, *Cayley* 2371, 2372. 2459, 2460.

D.

Delivery of Malt. Exceptional circumstances under which there is any check upon the delivery out of malt by the maltster, *Carling* 554–556.

Distilleries. Substitution of large establishments for small ones in the case of distilleries as well as of malt houses, *Stephenson* 123——Memorial received in witness's department, and official inquiry made on the subject, of the first process of distilling being used for brewing or distilling, *Carling* 550–553——Use of the more inferior barley for distilling, *Randall* 819–821.

Return of the quantity of malt used in distilleries on which duty has not been charged, since it has been allowed duty free, under the provisions of the Act 18 & 19 Vict. c. 94, *App.* 151.

Copy of memorial of the Scotch malt distillers and others to the Chancellor of the Exchequer in February 1866, praying for permission to send out a portion of the worts from their distilleries as beer, *App.* 160, 161——Reasons assigned by the Inland Revenue Department for objecting to the foregoing application, *ib.* 161.

Drawback (*Exported Beer*). Allowance of drawback in 1866 on 610,670 barrels of beer for export, *Stephenson* 38, 39——Information relative to the mode of computing the drawback, *ib.* 40——Calculation of the drawback on beer exported with reference to the gravity of the beer, *Carling* 286–288.

Drunkenness. Belief that there would be less drunkenness if good beer were cheaper, as by a repeal of the malt tax, *Pell* 3187–3191.

E.

Eastern Counties. Peculiar advantages of the eastern counties for the growth of the best barley, *Everett* 1202——Practice near Ipswich to grow one quarter of the arable land in barley, *ib.* 1308, 1309——Proportion grown of the several classes of barley, about one-half being the middling malting barley, *ib.* 1316, 1317——Very suitable soil in the eastern counties for the growth of good barley, *Clayden* 1588–1591——Doubt as to the growers of the best barley in the eastern counties being the most clamorous for the removal of the tax, *Bell* 3177–3180.

Ellman, Thomas. (Analysis of his evidence.)—Farms about 600 acres of land near Lewes, about 150 acres being barley land, 2091–2105——Considers that the repeal of the malt tax would lower the price of the best barley by about 5 *s.* a quarter; grounds for this conclusion, 2106–2112. 2222–2229——Severe pressure of the tax upon the inferior barleys, the price of which would increase if the tax were removed, 2113, 2114. 2128——Effect of the tax in checking the cultivation of barley, and in causing a rotation of crops not beneficial to the land, 2115–2122. 2129, 2130. 2160, 2161.

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Advantage in wetting malt for feeding; surfeit of the animals if used dry, as in the experiments by Mr. Lawes, 2147–2151. 2156. 2230–2234. 2238 ——Non-interference in witness's case with the use of sprouted barley for feeding, 2157–2159 ——Practice of witness to brew for his men, who prefer his beer to public-house beer, 2163–2169 —— Great boon to the labourers and their families if the malt tax were repealed, and if cottage brewing became general, as would probably be the case, 2170–2174.

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Evans, John. Letter from Mr. John Evans, of Uffington, relative to the beneficial effects of malt as food for sheep and cattle, *Smith* 2945.

Evasion (*Collection of Tax*). Very trifling extent to which the public revenue is now defrauded in the collection of the malt duty, *Stephenson*, 26–29. 64, 65. 83——Collection of the duty without much evasion, *Carling* 279, 280——Greater evasion if the tax were collected from a much larger number of persons, *ib.* 313, 314——Few evasions and convictions in the case of the malt tax, *ib.* 385–389.

Everett, Robert Lacey. (Analysis of his evidence.)—Farmer near Ipswich; is a grower of barley, and has paid considerable attention to the study of the malt tax, 1131–1144—— Obtained a prize for an essay on the malt tax two or three years ago, 1135, 1136—— Data for the calculation, that if the malt tax were repealed there would be an increase of from 3*s.* to 6*s.* per quarter in the price of the best barley, 1146, 1147. 1203, 1204. 1244–1258——Effect also of a repeal of the tax in enhancing the demand for, and the price of, the second and third class barleys, 1148, 1149. 1155–1167. 1173–1181—— Exceptionally high prices of the several classes of barley during the present year, 1150–1154. 1198–1201.

Necessity of the use of the inferior barleys for malting, if the tax were removed, as the consumption would greatly increase, and the supply of first-class barley is limited, 1158–1161. 1166, 1167—— Circumstance of the consumption of malt per head having been five bushels in 1723, whereas it is now only two bushels, this being owing to the malt tax, 1161–1163. 1183–1186——Probability of all barley sold as high as 40*s.* a quarter being malted, 1168, 1169——Requirement of the finest barleys for bitter ales, the demand for which is increasing, whilst the supply of first-class barley is limited, on account of difficulties of soil and climate, 1170. 1200–1206. 1215–1217. 1244–1258.

Doubt as to a repeal of the malt duty leading to any large import of foreign barley; question of quality and price adverted to hereon, 1171, 1172. 1212–1229. 1249–1261—— Good malt and beer to be made by stained barley and by grinding barley, though the quality of the beer would doubtless not be equal to that produced from first-class barley, 1174–1181——Increase of adulteration adverted to as one of the causes of the smaller consumption of malt per head than in former years, 1186. 1240–1243.

Varying weight of different kinds of barley with reference to the price and the quality for malting purposes, 1187–1191. 1196, 1197. 1552, 1553——Good average crop when six and-a-half quarters of the best barley are grown per acre, 1192 ——Injurious effect of sprouted grains when malted, 1193–1195—— Peculiar advantages of the eastern counties for the growth of the best barley, 1202——Very good barley grown in Yorkshire, 1205, 1206.

Reduced consumption of malt when the tax was raised during the Crimean war, whereas the consumption of beer continued the same; inference as to adulteration having been resorted to, 1209–1211. 1433, 1434. 1440. 1441——Examination as to the opportunities of witness for properly understanding the question of the malt tax, and for judging the effects of its repeal; reference hereon to his investigations in connection with the prize essay before alluded to, 1230–1239. 1277–1287. 1302–1307. 1435–1439.

Grounds for concluding that if the malt tax were removed the home malting trade would not be injured by the import of foreign malt, 1262, 1263——Further consideration of the price, quality, and production of foreign barley as compared with English barley; conclusion that the import would not be greatly increased if there were no malt duty, 1264–1271. 1291–1301. 1308–1315——Allowance of malt by the farmers in witness's locality to the labourers in harvest time; means of the latter for brewing, 1272–1276. 1339–1342.

Much less rise in the price of barley than is represented by the amount of the malt duty, if the latter were repealed, 1288——Malt bears a sea voyage much better than barley, 1289, 1290——Practice in witness's district to grow one quarter of the arable land in barley, 1308, 1309——Proportion grown of the several classes of barley, about one half

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half being the middling malting barley, 1316, 1317——Difference of from 6 *s.* to 8 *s.* per quarter between the price of the middling malting barley and the best barley, 1318——Belief as to the malt tax interfering with the proper rotation of crops, 1319.

Doubt as to the Malt by Weight Act having much operation in witness's district: its tendency however is beneficial, 1321–1325——Witness has not used malt for the feeding of cattle, but has a strong opinion of its value for that purpose; dissent hereon from the conclusions of Mr. Lawes, 1326–1338. 1435–1439. 1444–1450——Objection to the malt allowed for feeding purposes being ground to such a fine powder, 1327——Very few agricultural labourers who brew for themselves throughout the year, 1343——Great benefit to labourers and their families if they had facilities for brewing at home, without being subject to malt duty or beer duty; prevention thereby of the evils arising from frequent resort to public-houses, 1344–1349, 1355. 1384–1420. 1465–1502. 1537–1541. 1548–1551.

Conclusion that if the malt duty were repealed the revenue of the country would recover itself in a few years, without the substitution of any new tax, 1350–1353. 1458. 1471——Decided preference for a tax upon beer to that upon malt, 1354–1358——Calculations as to the relative prices of barley and malt, and as to the profits made by maltsters; also as to the prejudicial effect of the malt duty in greatly enhancing the cost to the consumer, 1359–1378. 1432. 1518–1526. 1544–1547.

Increase of about one-third in the price of beer, owing to the malt tax, 1361——Great facility to the people in former years for turning barley into malt, 1368. 1442, 1443——Varying amount of increase or outcast in making barley into malt, 1371–1374. 1425——Tendency of a more equal pressure of the duty to raise the price of the inferior barley, 1379–1381——Exceptional instances of cattle being fed with malt on account of the duty, 1382, 1383.

Examination upon the question whether it is desirable to encourage home brewing by cottagers, instead of an increased consumption of tea, coffee, &c.; conclusion as to the necessity of supplies of beer for labourers, 1384–1420. 1426–1429. 1463–1502. 1551——Practice as to the supply of malt to witness's labourers, and as to the strength of the beer brewed by the latter, 1426–1432. 1542, 1543——Much greater purity of beer if malt were considerably cheaper, 1433. 1473–1477——Probable difficulty as regards the spirit duties if the malt duty were repealed, 1459–1462.

Benefit to town labourers as well as agricultural labourers by an abolition of the duty, 1466–1472——Very limited effect of the Act for levying the duty by weight; that is, as regards any increase in the price of the inferior barleys, 1503–1516——Anticipation that but for the duty small malthouses would greatly increase, much to the benefit of the working classes, 1527–1531——Obstacles to the use of barley by the peasantry as an article of food, 1533–1536——Advantage of home brewing as furnishing supplies of yeast for home baking, 1537, 1538.

Large burden upon farmers on account of the duty upon the malt supplied by them to their labourers; question hereon, whether the burden does not rather fall on the consumers, 1554–1561——Consideration of the claim of labourers now receiving malt in harvest time, to any benefit from the remission of duty; belief that both the farmer and his labourers would share in the benefit, 1555–1581.

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Limited restrictions imposed upon the maltsters in connection with the collection of the duty, *Carling* 303–310——Duty of the Exciseman at breweries to see that no improper ingredients are used; several articles which may or may not be used, *ib.* 441–443. 494–506. 615–618——More frequent visits necessary if the Excise had to collect a beer tax in lieu of the malt tax, *ib.* 444, 445——Character of the detailed check exercised by the Excise officers with the manufacture of malt, *ib.* 524–530——Nature of the prescribed regulations as to plant and as to the period of steeping; slight inconvenience or increase of expense thereby, *ib.* 531–543. 597–601. 621–634.

Further particulars as to the supervision exercised over brewers so as to prevent the use of articles not exciseable, and to protect the revenue, *Carling* 557–581——Impracticability of visiting all the malthouses at frequent intervals, some of them being at a considerable distance from the Excise officers, *ib.* 586–596——Penalties provided in order to enforce the adoption of certain regulations by the maltsters, *ib.* 621–629——Compliance by the Excise with memorials for alterations or modifications of requirements whenever shown to be desirable, *ib.* 642, 643.

Great hardship in witness being prevented by the Excise regulations from using the barley off his land in such manner as he considers best suited to his stock, *Ellman* 2237, 2238——Doubt whether the Excise regulations would be more annoying or offensive in the collection of a beer tax from brewers than they now are, *Carling* 2701, 2702. 2721. 2753–2755. 2800——Great detriment to maltsters by the present uniform restrictions, *Lattimore* 2734–2736.

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Objection by brewers to the Excise supervision necessary in connection with the beer tax, *Pell* 3077. 3085-3087——Difficulty with respect to Excise supervision of private brewing in the event of a beer tax, *ib.* 3095-3100——Inspection already exercised by the Excise over brewers, so that a beer tax would not involve an entirely new supervision, *ib.* 3170-3176——Consideration of the Excise regulations necessary in connection with the collection of a beer tax, *Biddell* 3407-3414. 3470-3486. 3507.

Particulars of memorials received from maltsters during the last five years, complaining of Excise regulations or suggesting alterations to facilitate business; explanation in each case of the reasons for not complying with the applications of the memorialists, *App.* 157-160.

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Export of Malt. Large export to Australia and other places, without the malt being injured by travelling, *Stephenson* 139-143——Malt bears a sea voyage much better than barley, *Everett* 1289, 1290.

Account of the quantities of malt exported from the United Kingdom for each of the past ten years, to the 31st December 1866, showing the countries to which sent, *App.* 142.

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Farmers. Difficulty recently on account of the cattle plague, in getting the farmers in witness's district to discuss the malt tax question, *Cayley* 2262-2265——Statement that the malt tax should not be considered specially as a farmer's grievance, *ib.* 2483. 2530-2538——Comparative indifference of the farmers in witness's neighbourhood upon the question of abolishing the tax; the tax is in fact a public grievance, rather than a farmer's grievance, *ib.* 2530-2538——Explanation as to the farmers in witness's district not being so anxious as farmers in other districts about the removal of the tax, *ib.* 2584-2586. 2588.

Great injustice to the agricultural interest by reason of the tax upon the raw material, *Lattimore* 2703——Feeling of the farmers in Shropshire as to the grievance involved in the malt tax, *Smith* 2947-2949.

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FEEDING OF CATTLE:

1. *Failure of the Malt for Feeding Cattle Act of Mr. Gladstone: objections to the Mixture allowed under the Act.*
2. *Evidence as to the value of Malt for the Feeding of Sheep and Cattle.*
3. *Question as to the Use of Saccharised or Speared Barley for Feeding purposes.*
4. *Question of Feeding with dry Barley.*
5. *Opinion unfavourable to Malt or Barley for Sheep or Cattle.*

1. *Failure of the Malt for Feeding Cattle Act of Mr. Gladstone: objections to the Mixture allowed under the Act:*

Great decrease in the quantity of malt made free of duty, for the feeding of cattle, the demand having fallen off, *Stephenson* 52-55. 93, 94——Causes of the falling off in the manufacture of malt for feeding purposes further adverted to, *ib.* 115-118.

Failure of the manufacture of malt duty free, for the feeding of animals, the demand having fallen off, and the price having been enhanced by the carriage, *Carling* 289, 290. 300-302. 390-396——Failure of the Act in regard to the manufacture of malt for feeding cattle, further adverted to, *ib.* 467, 468. 471-473. 476.

Objection to the malt allowed for feeding purposes being ground to such a fine powder, as under Mr. Gladstone's Act, *Everett* 1327; *Lattimore* 2730; *Pell* 3034, 3035——Obstacle to a satisfactory use of the mixture allowed duty free for cattle, *Clayden* 1620——Practical difficulty in the use of the mixture allowed under Mr. Gladstone's Act further adverted to; difficulty also on the score of price, *ib.* 1623, 1624. 1699-1701. 1710-1713. 1749.

Conclusion as to the unfitness for feeding purposes of the mixture under Mr. Gladstone's Act, *Ellman* 2131-2133——Very little benefit derived from the Malt for Feeding Cattle Act, *Lattimore* 2628-2630——Objection to the necessary use of linseed as under this Act, *ib.* 2628. 2633, 2634. 2730. 2751——Useless character of the feeding mixture allowed under Mr. Gladstone's Act, chiefly on account of its being too fine, *Smith* 2874-2877. 2930-2932. 2940. 2947——Obstacles to the satisfactory use of the feeding mixture allowed under Mr. Gladstone's Act, *Biddell* 3312-3316.

FEEDING OF CATTLE—continued.

2. *Evidence as to the Value of Malt for the Feeding of Sheep and Cattle:*

Witness has not used malt for the feeding of cattle, but has a strong opinion of its value for that purpose; dissent hereon from the conclusions of Mr. Lawes, *Everett* 1326–1338. 1435–1439. 1444–1450——Use of malt by witness for feeding cattle for exhibition, *Clayden* 1619——Conclusion as to the advantages of malt for feeding sheep and cattle, and as to the large use to be made of it for this purpose but for the duty, *ib.* 1625–1630——Advantage of malt as a condiment in the manufacture of cattle foods, *ib.* 1714–1718——Great difference between dry malt and sprouted barley as regard flavouring qualities, *ib.* 1744–1748. 1761–1763——Considerable portion of the barley grown on heavy soils which is fit only for feeding purposes, *ib.* 2075–2077.

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TO THE

REPORT

FROM THE

SELECT COMMITTEE

ON

MALT TAX.

Ordered, by The House of Commons, *to be Printed,*
25 *July* 1867.

470—I.

Under 4 *oz.*

MINUTES OF EVIDENCE

TAKEN BEFORE THE

SELECT COMMITTEE

ON

METROPOLIS SUBWAYS BILL;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE

AND

AN APPENDIX.

Ordered, by The House of Commons, *to be Printed,*
30 *July* 1867.

495.

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Thursday, 30th May 1867.

THE METROPOLIS SUBWAYS BILL

Read a second time, and committed to a Select Committee of Ten Members, of whom Five shall be nominated by the Committee of Selection.

Thursday, 6th June 1867.

Committee nominated of—

Mr. Tite. Mr. Floyer. Mr. Jackson.	Mr. M'Cullagh Torrens. Mr. Paull.

Ordered, THAT the Committee have power to send for persons, papers, and records.

Ordered, THAT five be the quorum of the Committee.

Ordered, THAT all Petitions presented during the present Session against the Bill be referred to the Committee, and such of the Petitioners as pray to be heard by themselves, their Counsel, or Agents, be heard upon their Petitions, if they think fit, and Counsel heard in favour of the Bill against the said Petitions: That the parties appearing before the Committee have leave to print the Minutes of the Evidence taken before the Committee, day by day, from the Committee Clerk's copy, if they think fit.

Friday, 7th June 1867.

Members added by the Committee of Selection—

Mr. Bagwell. Mr. R. W. Duff. Viscount Galway.	Mr. Grove. Major Cornwall Legh.

Thursday, 20th June 1867.

Ordered, THAT the Minutes of Evidence taken before the Select Committee on the Metropolitan Subways Bill in Session 1864, be referred to the Select Committee on the Metropolis Subways Bill.

The following Petitions against the Bill were referred to the Committee.

(Presented June 13th.)

East London Waterworks Company.

(Presented June 17th.)

Southwark and Vauxhall Water Company.
Grand Junction Waterworks Company.
Chelsea Waterworks Company.
London Gaslight Company.
Independent Gaslight and Coke Company.
City of London Gaslight and Coke Company.
Phœnix Gaslight and Coke Company.
Surrey Consumers Gas Company.
New River Company.

(Presented June 18th.)

Western Gaslight Company.
Great Central Gas Consumers Company.
West Middlesex Waterworks Company.
Lambeth Waterworks Company.

(Presented June 19th.)

Gaslight and Coke Company.
Equitable Gaslight Company.

(Presented June 20th.)

Imperial Gaslight and Coke Company.
South Metropolitan Gaslight and Coke Company.

(Presented June 24th.)

Ratcliff Gaslight and Coke Company.

REPORT

THE SELECT COMMITTEE to whom the METROPOLIS SUBWAYS BILL was referred, have examined the allegations of the Bill and found the same to be true, and have gone through the Bill and made Amendments thereunto

30 *July* 1867.

PROCEEDINGS OF THE COMMITTEE.

Tuesday, 18*th June* 1867.

MEMBERS PRESENT:

Mr. Tite.	Mr. Floyer.
Major Cornwall Legh.	Lord Galway.
Mr. Bagwell.	Mr. Paull.

Mr. TITE was called to the Chair.

The Committee deliberated.

[Adjourned till Friday next, at Twelve o'clock.

Friday, 21*st June* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Floyer.	Mr. Bagwell.
Mr. Paull.	Mr. Robert Duff.
Lord Galway.	Major Cornwall Legh.

The Committee deliberated.

Parties called in.

Preamble read the first time.

Counsel for the Bill:—Mr. *Rodwell*, Mr. *Cripps*, and Mr. *Wilkinson*.

Agents:—Messrs. *Dyson & Co.*

Petitions against the Bill were read from—

East London Waterworks Company.
Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.
Agents:—Messrs. *Dorington & Co.*

Southwark and Vauxhall Water Company.
Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.
Agents:—Messrs. *Dorington & Co.*

Grand Junction Waterworks Company.
Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.
Agents:—Messrs. *Dorington & Co.*

Chelsea Waterworks Company.
Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.
Agents:—Messrs. *Dorington & Co.*

London Gaslight Company.
Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.
Agents:—Messrs. *Sherwood & Co.*

Independent Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

City of London Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

Phœnix Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

Surrey Consumers Gas Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

New River Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Dorington & Co.*

Western Gaslight Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

Great Central Gas Consumers Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

West Middlesex Waterworks Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Dorington & Co.*

Lambeth Waterworks Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Bell, Steward, & Lloyd.*

Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

Equitable Gaslight Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

Imperial Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.

Agents:—Messrs. *Sherwood & Co.*

South Metropolitan Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke* Mr. *Clerk*, and Mr. *Richards*

Agents:—Messrs. *Sherwood & Co.*

Mr. *Rodwell* opened the case in support of the Preamble of the Bill.

Room cleared.—The Committee deliberated.

Resolved,—" That the Committee are of opinion that it is unnecessary for the Promoters to go at any great length into the question of the inconvenience of breaking up the streets."

Parties called in, and informed of the decision of the Committee.

Mr. *Lewis Henry Isaacs* and Mr. *Marriott Ogle Tarbotton* were severally called, and examined.

[Adjourned till Tuesday next, at Twelve o'clock.

Tuesday, *25th June* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Major Cornwall Legh.
Mr. Floyer.
Mr. Grove.
Lord Galway.
Mr. Bagwell.
Mr. R. W. Duff.
Mr. Paull.
Mr. Jackson.

A Petition against the Bill was read from Ratcliff Gaslight and Coke Company.

Counsel:—Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*.
Agents:—Messrs. *Sherwood & Co.*

Mr. *Joseph William Bazalgette* and Mr. *George Willoughby Hemans* were severally called, and examined on behalf of the Promoters.

[Adjourned till To-morrow, at Twelve o'clock.

Wednesday, *26th June* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Jackson.
Mr. Floyer.
Mr. Paull.
Mr. Bagwell.
Mr. R. W. Duff.
Lord Galway.
Mr. Grove.
Major Cornwall Legh.

Mr. *Frederick J. Bramwell*, Mr. *William Allen Boulnois*, Mr. *William Pole*, Mr. *Frederick John Evans*, and Mr. *Robert Jones*, were severally called, and examined on behalf of the Promoters.

[Adjourned till To-morrow, at Twelve o'clock.

Thursday, *27th June* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Floyer.
Mr. R. W. Duff.
Mr. Bagwell.
Mr. Grove.
Major Cornwall Legh.
Lord Galway.
Mr. Paull.
Mr. Jackson.

Mr. *Frederick Marrable*, Mr. *Henry Edward Jones*, Mr. *Edward Easton*, Mr. *Robert Pitchenau*, Mr. *Alfred Upward*, Dr. *Edward Frankland*, Mr. *Dugald Campbell*, Mr. *William Walker*, and Mr. *Edwin Patchett*, were severally called, and examined on behalf of the Promoters.

[Adjourned till To-morrow, at One o'clock.

Friday, 28th June 1867.

MEMBERS PRESENT:

Lord GALWAY in the Chair.

Mr. Floyer.	Major Cornwall Legh.
Mr. Grove.	Mr. R. W. Duff.
Mr. Paull.	Mr. Bagwell.
Mr. Jackson.	

On behalf of the Petitions of the Gas and Water Companies, Mr. *James Muir* and Mr. *Thomas Emerson Forster* were severally called, and examined.

Mr. *Joseph William Bazalgette* was further examined on behalf of the Promoters.

[Adjourned till Tuesday next, at Twelve o'clock.

Tuesday, 2nd July 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Floyer.	Mr. Paull.
Mr. Grove.	Mr. Jackson.
Lord Galway.	Mr. Bagwell.
Major Cornwall Legh.	Mr. R. W. Duff.

Mr. *Charles Greaves* and Monsieur *M. Francois E. Belgrand* were severally called, and examined on behalf of the Petitioners.

[Adjourned till To morrow, at Twelve o'clock.

Wednesday, 3rd July 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Major Cornwall Legh.	Mr. R. W. Duff.
Lord Galway.	Mr. Grove.
Mr. Bagwell.	Mr. Jackson.
Mr. Paull.	

Mr. *John Frederic Bateman* and Mr. *Thomas Hawksley* were severally called, and examined.

[Adjourned till To-morrow, at Twelve o'clock.

Thursday, 4*th July* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Floyer.
Mr. R. W. Duff.
Lord Galway.
Major Cornwall Legh.
Mr. Bagwell.
Mr. Paull.
Mr. Jackson.
Mr. Grove.

Mr. *Thomas Hawksley* and Mr. *John Thomas Woodehouse* were severally called, and examined; Mr. *Frederick J. Bramwell* re-called, and examined by the Committee; and Mr. *James Simpson*, Mr. *William Innes*, and Mr. *Horatio Brothers*, were severally called, and examined.

Dr. *John Percy* called, and examined with reference to certain experiments on behalf of the Promoters.

Room cleared.—The Committee deliberated.

Resolved,—"That if the Promoters choose to make experiments, under the guidance of Dr. Percy, and give the Opponents of the Bill a fair opportunity of attending to see the experiments performed, the Committee will be ready to hear Dr. Percy on Tuesday, and to take his evidence with regard to the experiments."

Parties called in, and informed of the decision of the Committee.

[Adjourned to Tuesday next, at Twelve o'clock.

Tuesday, 9*th July* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Floyer.
Mr. R. W. Duff.
Mr. Bagwell.
Mr. Jackson.
Lord Galway.
Mr. Paull.
Mr. Grove.
Major Cornwall Legh.

Mr. *Rodwell*, on behalf of the Promoters, stated that experiments had been made under the guidance of Dr. Frankland (Dr. Percy being unable to attend), and that Dr. Frankland was present to give evidence of the result of the experiments.

Dr. *Edward Frankland*, Mr. *Dugald Campbell*, and Mr. *George Frederick Ansell*, were severally called, and examined.

Dr. *Henry Letheby*, Dr. *William Odlin*, and Mr. *Thomas Hersey*, were severally called, and examined on behalf of the Petitioners.

Upon Mr. *Denison* proposing to put in evidence a letter from M. Belgrand, received subsequent to his examination, Mr. *Rodwell* objected, on the ground that he would have no opportunity of cross-examining the writer upon the contents.

Mr. *Denison* was heard in reply.

Room cleared.—The Committee deliberated.

Motion made and Question put,—"That a letter written by Monsieur Belgrand subsequently to his examination before the Committee, and objected to by Counsel, be put in evidence"—(Mr. *Floyer*.)

The Committee divided.

Ayes, 3.	Noes, 5.
Mr. Floyer.	Mr. Jackson.
Mr. Bagwell.	Mr. Paull.
Mr. R. W. Duff.	Lord Galway.
	Mr. Grove.
	Major Cornwall Legh.

Parties called in, and informed of the decision of the Committee.

[Adjourned till To-morrow, at Twelve o'clock.

Wednesday, 10*th July* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Floyer.
Mr. Bagwell.
Mr. Jackson.
Major Cornwall Legh.
Mr. Paull.
Mr. Grove.
Mr. R. W. Duff.

Mr. *Denison* addressed the Committee on behalf of the Petitions of the Water and Gas Companies, against the Bill.

Mr. *Rodwell* was heard in reply upon the whole case.

The Committee deliberated.

[Adjourned till To-morrow, at Two o'clock.

Thursday, 11*th July* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Mr. Jackson.
Lord Galway.
Major Cornwall Legh.
Mr. Paull.
Mr. Floyer.
Mr. Bagwell.
Mr. R. W. Duff.
Mr. Grove.

The Committee deliberated.

Resolved.—"That the Committee are prepared to pass the Preamble of the Bill, subject to Provisions to be embodied in Clauses to be submitted to the Committee, to the following effect:

1. That the operation of this Act should be limited to the subways named in the Schedule.

2. That no rent shall be chargeable.

3. That supervision shall be provided by the Board of Works in such manner or on such terms as may be agreed upon between the Board of Works and the Companies.

4. That the cost of removing the pipes from any existing street into the subways be defrayed by the Metropolitan Board.

Parties called in, and informed of the Resolution of the Committee.

[Adjourned till To-morrow, at 12 o'clock.

Friday, 12*th July* 1867.

MEMBERS PRESENT:

Mr. TITE in the Chair.

Major Cornwall Legh.	Mr. R. W. Duff.
Lord Galway.	Mr. Jackson.
Mr. Paull.	Mr. Grove.
Mr. Floyer.	Mr. Bagwell.

Mr. *Rodwell* was heard with reference to Clause 10A.

Mr. *Denison* was heard on the other side.

Mr. *Rodwell* was heard in reply.

Room cleared.—The Committee deliberated.

Resolved,—"That the Committee wish to secure efficient state of repair and ventilation, and will consider any words which may be proposed to that effect, if any doubt exists."

That they will consider Clause 10A when it comes regularly before them.

Parties called in, and informed of the Resolution of the Committee.

Room cleared.—The Committee deliberated.

Preamble read a second time.—Question "That the Preamble of the Bill is proved,"—put, and *agreed to.*

Parties called in, and informed thereof.

The Committee went through the Bill Clause by Clause, and made several Amendments.—New Clauses *added.*

Bill, as amended, to be reported.

Ordered, To Report.

MINUTES OF EVIDENCE.

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MINUTES OF EVIDENCE.

Friday, 21*st June* 1867.

MEMBERS PRESENT:

Mr. Bagwell.	Mr. Cornwall Legh.
Mr. R. W. Duff.	Mr. Paull.
Mr. Floyer.	Mr. Tite.
Viscount Galway.	

MR. TITE IN THE CHAIR.

21 June 1867.

The Petition for the Bill was read.

Mr. *Rodwell,* Mr. *Cripps,* and Mr. *Wilkinson* appeared as Counsel for the Promoters of the Bill.

Messrs. *Dyson* & *Co.* appeared as Agents.

The following Petitions against the Bill were read:

The Petition of the New River Company.

Mr. *Hope Scott,* Mr. *Denison,* Mr. *Burke,* Mr. *Clerk* and Mr *Richards* appeared as Counsel for the Petitioners.

Messrs. *Dorrington* & *Co.* appeared as Agents.

The Petition of the South Metropolitan Gas Company.

Mr. *Hope Scott,* Mr. *Denison,* Mr. *Burke,* Mr. *Clerk,* and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood* & *Co.* appeared as Agents.

The Petition of the Phœnix Gas Company.

Mr. *Hope Scott,* Mr. *Denison,* Mr. *Burke,* Mr. *Clerk,* and Mr. *Richards,* appeared as Counsel for the Petitioners.

Messrs. *Sherwood* & *Co.* appeared as Agents.

The Petition of the Equitable Gas Company.

Mr. *Hope Scott,* Mr. *Denison,* Mr. *Burke,* Mr. *Clerk,* and Mr. *Richards,* appeared as Counsel for the Petitioners.

Messrs. *Sherwood* & *Co.* appeared as Agents.

21 June 1867.

The Petition of the Imperial Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*, appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the Chartered Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*, appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the Lambeth Waterworks Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*, appeared as Counsel for the Petitioners.

Messrs. *Bell, Steward & Lloyd*, appeared as Agents.

The Petition of the West Middlesex Water Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Dorrington & Co.* appeared as Agents.

The Petition of the Great Central Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the Western Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the Surrey Consumers Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the City of London Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the Independent Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the London Gas Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Sherwood & Co.* appeared as Agents.

The Petition of the Chelsea Waterworks Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards* appeared as Counsel for the Petitioners.

Messrs. *Dorrington & Co.* appeared as Agents.

21 June 18

The Petition of the Grand Junction Waterworks Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*, appeared as Counsel for the Petitioners.

Messrs. *Dorrington* & *Co*. appeared as Agents.

The Petition of the Southwark and Vauxhall Water Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr. *Richards*, appeared as Counsel for the Petitioners.

Messrs. *Dorrington* & *Co*. appeared as Agents.

The Petition of the East London Waterworks Company.

Mr. *Hope Scott*, Mr. *Denison*, Mr. *Burke*, Mr. *Clerk*, and Mr *Richards*, appeared as Counsel for the Petitioners.

Messrs. *Dorrington* & *Co*. appeared as Agents.

Mr. *Denison*.] Before the Committee proceeds, I have to perform an unpleasant duty. I merely wish to state in the fewest possible words, with reference to a possible course hereafter, that my clients entirely protest against the Committee as it is now constituted. Of course we have no power to alter it; you will do as you please. All that we say is simply this, that there is in Parliamentary history, so far as we can ascertain, no precedent for the same person being the promoter of a Bill, a witness for the Bill, a judge, and the president of the tribunal. Having said that, I say no more.

Chairman.] You do not put in any written protest.

Mr. *Denison*.] I merely put that upon record. I say no more.

Mr. *Bagwell*.] It is just as well to inform the learned counsel that we have considered that matter this morning, and we are quite satisfied with the decision at which we have arrived.

Chairman.] Perhaps I need hardly say for myself, that the evidence I gave upon a former Bill is in print, and therefore may be easily seen; but officially I bring in this Bill as the representative of the Metropolitan Board, together with Colonel Hogg. We are two members of the Metropolitan Board, and somebody, I apprehend, must bring in the Bill. I deny altogether that I am going to deal unfairly with the matter in any way, if that is meant, which I suppose it is. I can only say that I put it fairly before the Committee, and if they choose to alter the appointment it is in their power to do so. I have put it before them, and they have not thought right to do so.

Mr. *Rodwell* was heard to open the case on behalf of the Promoters of the Bill.

The Committee-room was cleared.

After some time the Counsel and Parties were again called in.

The *Chairman* stated that the Committee were of opinion that it would be unnecessary upon the part of the Promoters to go at any great length into the question of the inconvenience of breaking up the streets.

Mr. *Lewis Henry Isaacs* called in; and Examined by Mr. *Wilkinson*.

1. You are Surveyor of the Holborn district, I believe?—I am.

Mr. *L. H. Isaacs*.

2. You gave evidence before the Committee on the former inquiry in 1864, did you not?—I did.

3. Without taking you in detail through your evidence, just let me ask you to present to the Committee a little information upon the subject of your district; that district commences at about Queen-square, Bloomsbury, and terminates at Old-street, St. Luke's, does it not?—Yes.

4. It is about a mile and a half long, and about half a mile wide, is not it?—Yes; that is about its area.

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5. With regard to the thoroughfares in your district, will you explain to the Committee their nature, and whether they are much used or not?—The principal thoroughfare in my district is that of High Holborn. In my opinion that thoroughfare is more used for vehicular traffic than any other in London; some of those side streets are very much used, such streets as Gray's-inn-road, that being a direct approach from the north to south of London, and being used for omnibus traffic, as an approach from the north to the west of London; other thoroughfares, such as Red Lion-street, form direct approaches to Euston-square, and, consequently receive a very large amount of traffic.

6. With reference both to Gray's-inn-road, and to Holborn itself, you gave evidence of a large number of openings previous to the year 1864, did not you?—Yes.

7. Five thousand three hundred and thirty-two openings in five years?—Yes.

8. I will not go into detail, because they are before the Committee in the evidence which you gave; but I will ask you this; did you upon that occasion, and have you upon subsequent occasions, endeavoured to make arrangements with the gas and water companies with a view that the roads should be as little disturbed as possible?—Yes; I stated to the Committee, in 1864, that the invariable custom of the Holborn Board, before they commenced any paving operation of magnitude, was to intimate to the various gas and water companies having mains and pipes in the roads, that such was their intention; and to ask them to take advantage of the circumstance to do any repair that might be necessary to their pipes or mains, or to lay down any new mains that might be requisite at the time; and I have to state to the Committee, that although the Board of Works invariably represented that intention to the gas and water companies, they met with no response; it has frequently happened that within a very short period of their repaving thoroughfares, the companies have come in and have torn them up again from end to end, when, as we allege they could have done the work at the time that the paving works were in hand, just as well as subsequently.

9. Let me invite you to give one illustration respecting the conduct of the New River Company, when you had occasion to open Gray's Inn-road?—I think I stated in my evidence in 1864, that the whole of Gray's Inn-road from Holborn to King's Cross, was repaved at a cost of something like 14,000 *l.*; the companies were invited to take advantage of that circumstance, to do any works which might be necessary, but they failed to do so, and within a very short period the New River Company came in and drove two trenches, one on either side of the road, from one end to the other of that thoroughfare.

10. That was done, I think, pending the inquiry at the time; the former inquiry was pending before the Committee?—I think that that operation was in hand then.

11. I think on that occasion, by letter, you remonstrated with the New River Company on their conduct?—We did.

12. Independently of the disturbance to the streets, the operations of the companies involved your parish in great expense, did not they?—They did; we have to keep a large staff of workmen to repair the pavements that are disturbed; I do not wish to say that there is no endeavour on our part to recoup ourselves, we endeavour to do so, but the money we receive from the companies fails to cover the actual cost of the damage that is done by the companies.

13. The theory is, that the companies are to recoup you?—The theory is, that the Board of Works recoups itself the expense to which it has been put; but I desire to state that the expense is not covered by the charges made to the companies, and that arises from the fact that, when once a pavement has been disturbed, it can never be restored to its original surface, and an amount of wear and tear goes on which is not covered by the charges made to the companies for the repair.

14. Without taking you further into detail, into anything that occurred before the year 1864, upon which you have already given evidence, let me ask you to state what has been your experience since the year 1864 up to the present time?—I wish to put before the Committee two short extracts from a report by the Board of Works to the inhabitants of the district, to the ratepayers of the district, one for the year 1865, and the other for the year last past, 1866.

15. By the report, you mean only such parts as refer to this subject?—Quite

so; I will read to you that portion of the report of 1865 which bears upon this matter. The Board said, "The staff of workmen engaged by the Board has been largely occupied in repaving the trenches opened by the gas and water companies, whose operations, in this respect, have been greatly in excess of those of former years, as evidenced by the sum received from the companies for these works, namely, 1,783 *l.* 10 *s.* 7 *d.*, which is about four times the average amount received on this account during previous years. The Board desire to observe that this is by no means a subject for congratulation to the ratepayers, as, notwithstanding their determination to charge the companies the total cost of reinstating the pavements, as far as the same can be ascertained, the injury created by the companies' operations causes a permanent deterioration of the roadways, which no charge for reinstatement, which they can impose, will adequately cover. With the view of assisting the Metropolitan Board of Works in their laudable endeavours to reduce to a minimum the necessity for opening the public roads for the repair of the companies' pipes and mains, the Board instructed their surveyor to give evidence before the Parliamentary Committee appointed to consider the Metropolis Subways Bill, as to the necessity of such a measure becoming law; and they have to express their regret that, owing to the formidable opposition of the whole of the gas and water companies of the metropolis combined, only so much of the preamble of the Bill was proved as to render it inadvisable for the Metropolitan Board of Works to prosecute it further. The Board express a hope that these efforts to remedy an evil, which may be pronounced a standing reproach to the science of the day, will be again renewed, and that Parliament being once more appealed to, may see fit to render it obligatory on the whole of the companies to make use of subways wherever provided." That is an extract from a report of the year 1865.

16. Was that report adopted?—That report was adopted, and was printed and circulated amongst the inhabitants; I will now give a shorter extract from their report of 1866, as that contains another illustration of what the Board so much complained of, namely, the needlessly tearing up of the pavements immediately they are put down.

17. Mr. *Paull.*] I think this is rather their evidence than yours, is not it?—I am an official of the Board.

18. *Chairman.*] Did you draw up the report?—It was the report of our committee.

19. Mr. *Wilkinson.*] You being an officer of the Board?—Yes.

20. Mr. *Paull.*] It is better to take the evidence of the witness himself than to read a long extract?—I quite endorse the opinions contained in that report.

21. *Chairman.*] What is the effect of that?—In 1866 the Board say this: "The Board would here more particularly refer to the circumstance that notwithstanding they gave the respective companies timely notice of their intention to repave the carriage-way of Liquorpond-street in the spring of last year, and requested that advantage might be taken of the opportunity thus afforded of executing any repairs necessary to the pipes and mains therein; their invitation was not responded to, and they were powerless to prevent the new roadway from being taken up for the entire length of the street within a few months of its being laid down by one of the companies whose mains were laid beneath the surface; comment upon such a proceeding must be unnecessary, and the Board can only reiterate the expression of their hope that legislative protection against so wanton a waste of the ratepayers' money may be speedily afforded."

22. Mr. *Wilkinson.*] So far as these facts mentioned in this report are concerned, are they in your knowledge as the officer of the Holborn district?—They are.

23. Am I right in saying that, so far as your experience goes, since the year 1864, there has not been any decrease in the inconvenience to which the parish is subject by the proceedings of the various companies?—No; as evidenced by the receipts from the various companies, the number of openings made in the pavements have largely increased.

24. That is since 1864?—Yes; since 1864.

25. With reference to accidents, I see that you gave evidence in the year 1862 of an accident which occurred from gas getting into the sewer, have you any further evidence to supplement that?—I think the evidence which I gave was with respect to an accident which occurred in Holborn. That was an accident where the gas companies were laying new mains along the footway; and, for the

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convenience of their customers, they were charging them with gas as they proceeded. By an accident the bladder which stopped the end of the main got displaced, and a man was at work with a fire repairing a joint of the New River Company's main close by, and the explosive compound got fired, and two men were killed and some injured. At that time I gave it as my opinion that if the operation had been conducted in a subway that accident could not have occurred.

26. Have you any other instance to supplement that with ?—We had another accident a short time ago in Somer's-street, where three houses were blown down. I do not wish to give an opinion upon that, as it is the subject of an inquiry at this moment.

27. At any rate, it arose from an explosion of gas laid in the ordinary way ?—Yes ; laid in the ordinary way.

Cross-examined by Mr. *Hope Scott.*

28. You have no subways in your district at the present time, have you ?—None.

29. Are they forming subways (I ask the question as a matter of curiosity) in the new Holborn viaduct ?—They are.

30. That is the City's doing ?—It is.

31. But otherwise you have none, and I suppose no immediate prospect of getting any ?—No immediate prospect.

32. There is no scheme that you are aware of ?—They are about to remove Middle-row in Holborn, but I suppose the Metropolitan Board would not give a subway there.

33. How many miles of subway would it require you to construct to accommodate your district to accommodate all the pipes lying there ?—There are 20 miles of roadway in my district.

34. But you are here upon the general question ; you are not likely to get rid of the openings in a hurry yourself, I think ?—I fear not.

35. You would still object to this inconvenience ; if I understand rightly from the evidence, you, repaving Gray's Inn-road in 1861, gave notice to the gas and water companies, who did not require to do anything in that roadway at the time ?—So they said.

36. I suppose they know their business as well as you do ?—I stated in 1864, and I am quite prepared to repeat it, that the New River Company put down in that road mains of an increased size, and I submit that as the whole of the Holborn district is covered with houses, and the wants of the inhabitants were accurately known, then the necessity for those increased mains, so as to give an improved supply of water, was as apparent in 1862 as it was in 1864.

37. In 1861, I think ?—In 1861 as it was in 1864.

38. So that you think that the company that did not actually lay down these mains till 1864, and who may have had good reasons for not doing so, which you cannot be aware of, were wrong not to have gone at once in 1861, upon your invitation, to lay down the mains ?—I take their letter in answer to a communication that was forwarded to them, and I take the reason which they gave for not laying down the main, and I say that the necessity for the main was as apparent at that time in 1861 as it was in 1864.

39. You say that it must have been as apparent ; that is your evidence ; I suppose it is rather costly amusement to a company breaking up the streets, is not it ?—No doubt it is.

40. You mentioned that in 1864 there were something like 5,000 applications ?—Five thousand three hundred and thirty in five years.

41. And that the companies have paid 4,000 *l.* in respect of those ?—Yes ; about that.

42. So that it is a thing not to be done by them, unless they feel the necessity, I presume ?—It is a very costly operation.

43. About this accident, do you represent that the accident which occurred that you have just described, would be an accident that would not have occurred, or be likely to have occurred in a subway ?—The one in Holborn could not have occurred in a subway.

44. Was not the fact this, that a workman of the water company was working close

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close to the unfinished mains of the gas company, and that he lit a fire for the purpose of making a joint, and that fire caused an explosion ?—Yes ; but you are omitting to state that the bladder got displaced.

45. Who displaced the bladder ?—One of the passers by in the street.

46. Is that proved ?—Yes.

47. It is suggested to me that it was the volunteers who disturbed the bladder; that could not have occurred, you think, if it had been in a subway ?—No ; certainly not, there could have been no chance of it occurring.

48. Do you think that for a workman to work close to a gas main, in a confined space would be a convenient way of carrying on the business ?—There would be some amount of risk attending the operation, but if you remove the public from the chance of displacing the bladder, of course you reduce that risk to a minimum.

49. Then it is the volunteers who displaced the bladder, which constitutes the difference between an accident of this kind occurring in a street and occurring in a subway ?—I did not say the volunteers, but the public generally.

50. Have you considered what the result of this accident, which occurred when two men were killed and two others were seriously injured, would have been if it had occurred in a subway by workmen taking a fire to repair a joint close to a gas pipe ?—I have not considered what would have been the result.

Chairman.] What is meant by the bladder ; what is its purpose ?

Mr. *Hope Scott.*] It stops the orifice of the gas pipe. That is, they were filling their pipes as they went along, and the evidence is that they stopped up the end of their pipe with a bladder, which the volunteers displaced.

Witness.] They put a bladder at the end of the main, and then it is filled with air, and thus the chamber becomes plugged.

Re-examined by Mr. *Wilkinson.*

51. As I understand you, you mentioned that as an illustration of the greater safety of performing an operation of that character where no interruption can arise from the public ?—Quite so.

52. One word with reference to the delay in the New River Company ; your district is not one of the outlying districts, where new buildings are going on very rapidly ?—No ; it is the very centre of London.

53. I observe that in the reply which the New River Company gave to you they said that the works were undertaken wholly with the object of an improved supply of water to their consumers, and more especially to the inhabitants of the Holborn district ?—Yes ; but I take leave to doubt the accuracy of that statement.

54. Would there have been any reason why they should not have known that in 1861 which they did in 1864 ?—There is not a shadow of reason.

55. You know that no new facts had occurred ?—None whatever.

56. In the Holborn Improvement Act there is power to make a subway, is there not ?—Yes ; you will find it in the schedule attached to the Bill.

57. Do you contemplate the necessity of a subway in any other than quite a leading thoroughfare ?—I think it is not likely to be.

58. Therefore, with regard to the 20 miles of roadway, those 20 miles of roadway are pretty well built upon and occupied already, are they not ?—Quite so.

59. They are not like a series of new streets stretching into the country ? —No.

60. *Chairman.*] How large were the pipes which the New River Company put down ?—Speaking from memory, I think it was either a 2-foot, or a 2-foot 6-inch main.

61. In diameter ?—Yes ; they put down two, one on each side of the road, so that we had two trenches in the street.

62. On either side of the street ?—Yes.

[The Witness withdrew.

Mr. *Marriott Ogle Tarbotton*, called in; and Examined by Mr. *Cripps*.

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63. You are a Civil Engineer?—I am.

64. And you have for about eight years past been the surveyor of the Corporation of Nottingham?—I have.

65. And for some years past been engaged in public works?—For the last 17 years.

66. Have you, in your practice, given great attention to the question of subways, and to the prevention of breaking up of highways in large towns?—I have evidence, I have been connected officially with a public body, such as the corporation, for in fact the last 12 years.

67. You know generally, no doubt, the objects of the Bill which is now before this Committee?—I do.

68. In your opinion, are subways properly constructed and ventilated, useful, not only for the prevention of breaking up of the roadway, but also for the gas and water companies themselves?—I consider so.

69. Do you consider it an advantage among other things that they can be regularly inspected in such a position as they would be placed?—I consider that the mains and services can be more carefully and properly laid in subways, and would be less affected by outward circumstances, such as vibration, and the deterioration of pipes, and also that the streets would not be broken up to the extent they are at the present time.

70. You speak of vibration. When the pipes are laid, as now laid in the streets, are they liable to be injured by the vibration caused by the traffic passing over them?—To a very large extent.

71. In the subways; how is that?—In the subways there is no vibration whatever. The pipes are laid either upon the floor of the subway, or beneath the floor, and, therefore, they are altogether without the influence of any external traffic.

72. So that so far as the injury, whatever it may be by vibration, goes, they are decidedly better when laid in the subways than upon the surface?—Undoubtedly.

73. Do you think that there is more facility for preventing leakage in pipes laid in the subway than in the ordinary way?—Yes; for those reasons I consider it is so.

74. Would you also consider it advisable with pipes laid in the subway, that they should be coated with something which cannot be done equally well if laid as they are at present?—I think a coating of bitumen or varnish, would tend to prevent oxidation and rust, and the constant wearing out of the pipes; of course that could be done from time to time in the subway.

75. That would be another advantage in your opinion, in laying them in subways?—Certainly.

76. Do you think that leakage is also occasioned by the frequent necessity which exists for disturbing the ground for other purposes, when they are laid in the ground?—For many purposes; for almost every purpose in opening the streets in connection with sewerage and drainage, and for the purpose of making connections with gas and water pipes; I have seen that daily for the last 12 years.

77. You say that in all those different cases, that disturbance is liable to cause leakage in pipes that have been already laid down?—It does to a great extent occasion fractures in pipes, and cause leakage in the joints.

78. That would be also prevented if they were laid in the subways?—Altogether.

79. With reference to the possible escape of gas, assuming the pipes to be laid in the subway, do you apprehend that with proper ventilation there would be any danger at all in that?—I apprehend that if the pipes were properly laid in the subway, there would be no escape of gas; if an escape from any other circumstance took place it would be readily detected, if it arose when no one was about, or during the night the ventilation of the subway (if it were perfect, as I believe those already made are), would cause it to pass away without doing injury to any one.

80. That is, of course, assuming that it was done properly, and that there were proper means of ventilation?—Certainly.

81. With regard to water-pipes if laid in the subway, would there be every facility for carrying off the leakage without doing any damage?—In the subways which I have constructed there is every facility for removing all leakage from the pipes; but we have had no leakage to the present time whatever.

82. Is there any difficulty, in your opinion, in connecting the pipes in the subways with the pipes in the streets where they are not laid in the subways?—I do not see any difficulty; I know that difficulty has been suggested in that respect, but, as far as I know the metropolitan subways and our own, there can be no difficulty whatever. The pipes can be either taken in under, through, or over the subways according to circumstances.

83. Now, with regard to your special experience at Nottingham, did the Corporations, in the years 1861 and 1862, purchase some property in the centre of the town for the purpose of forming new streets?—Yes; a very large quantity.

84. Those, I think, were purchased and completed in the year 1863?—They were completed in 1863 under the power of an Act of Parliament.

85. Viscount *Galway.*] Whereabouts in Nottingham was that?—In the centre of the town; in what was Bottle-lane and Chandos-lane, near the Poultry; geographically, in the very centre of Nottingham.

86. Mr. *Cripps.*] Are the streets which are now formed in that part now called Victoria-street and Queen-street?—Yes.

87. Had you yourself the charge of the design for laying out those streets in the first instance?—I had.

88. Were they constructed under your superintendence?—Entirely.

89. In those streets, did you take care to have subways constructed for the same purposes as are now suggested by the present application?—We constructed a subway under Victoria-street, and under Queen-street, for the same purposes as those here in London are intended.

90. Have you yourself seen the subways in London, in the street by Covent Garden, Garrick-street, I think it is called?—Several times.

91. Are those that are constructed in that new street in London of the same kind as those which you constructed at Nottingham?—Somewhat so; in fact, very nearly so; I have a plan here which shows the construction of our subways altogether.

92. Perhaps if you have the plan it will be as well to show it now?—This is the position of the streets (*exhibiting the plan*); this is the Poultry, in Nottingham; this is the very centre of the town; this was a mass of old property, very much resembling that at Garrick-street, Covent Garden, and Rose-court, and all about there; it was taken down for sanitary purposes, and also for the purpose of making a better communication from east to west through here; this street is 50 feet wide, and accomplishes these purposes; this is the new street; this portion of the plan shows the surface of the street as completed, the footpaths and the paved carriage road; the street is the same width as the one at Covent Garden, exactly 50 feet; the upper part of the plan shows the subterranean construction, consisting of the subways and the sideways to the properties and vaults, which, of course, are sold with the lots of land, and used as coal cellars; the subway is shown in the sections here; it consists of a passage 10 feet wide, and 6 or 7 feet high, as shown there; it is an arched passage; beneath the subway is a sewer running down the centre, shown in the blue lines upon this plan, under the subway; from the subway connections are made about three feet wide to the properties, lateral connections, in order that the drainage pipes, and gas and water pipes, may be laid continuously from the floor of the subway along these passages into the vaults, without breaking up the surface of the street at all; this is a plan showing a connection, it shows half the street; this is the centre line of the street, that being the line of subway, and that is one of the side passages; and along here the drains and pipes are laid.

93. *Chairman.*] Is that all done and in use?—That is all done, and it has been in use since the commencement of 1863; that is four years.

94. Mr. *Cripps.*] Does your plan show the lateral communication to the houses?—Yes; my plan shows the whole construction.

95. Does it show the sewer underneath in the same way as in the London subways?—The same.

96. Were

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96. Were the objects you had in view there the same as are the objects of the London subways, to carry the gas and water pipes?—Entirely the same.

97. About what was the entire length that you constructed under those two streets?—About 550 feet.

98. *Chairman.*] In the two streets?—In the two streets.

99. Mr. *Cripps.*] The width of the one in Victoria-street was, I believe, greater than that in Queen-street?—The one in Victoria-street is 10 feet wide, and the one in Queen-street is 8 feet wide.

100. *Chairman.*] Are they both the same height?—They are both the same height.

101. Do you know the width of ours in London?—I believe they are 12 feet wide.

102. Uniformly?—I believe uniformly.

103. Mr. *Paull.*] Wide?—Wide.

104. What is the height?—Six feet; ours are rather higher.

105. Mr. *Cripps.*] What do you give as the height of yours?—About seven feet.

106. When you constructed those subways the gas and water companies in Nottingham put down their pipes in those ways, did not they?—They were applied to by the Corporation to lay mains in the subways, and they did so.

107. Without objection?—Without objection.

108. And as laid there they have remained from that time to the present, I believe?—They have.

109. That was in the year 1863; you say that they have gone on from that time to the present; has there been any difficulty or any danger that has suggested itself to you from their being there from that time to the present?—I am not aware of any whatever.

110. Have you yourself been down the subways, and have your agents and men been down there frequently during this interval?—Constantly.

111. Have you ever observed when you have been down there, or has it ever been reported to you, that there has ever been any escape of gas from laying the gas main there?—There has not.

112. Or any leakage from the water pipes being there?—None, that I am aware of.

113. Are those subways ventilated at Nottingham?—They are all ventilated by means of openings in the archway; I am referring now to those in Victoria-street and Queen-street.

114. Mr. *Floyer.*] Is that the longest that you are speaking of in Victoria-street?—It is the longest of the two.

115. Viscount *Galway.*] When were those subways completed in Nottingham?—Early in 1863.

116. Mr. *Cripps.*] And the pipes laid in that year?—Yes; I refer to Victoria-street and Queen-street, because we have other subways in Nottingham.

117. With reference to temperature, you say that you and your agents have frequently had occasion to be there; have you found the temperature unpleasant or uncomfortable there?—Not at all; the temperature is singularly uniform, both when the external air is cold, and when the external air is very hot; I have taken gaugings of the temperature, which I can give the Committee if they like to have them.

118. *Chairman.*] They do not vary?—Very little.

119. Mr. *Cripps.*] You spoke of the ventilation; will you tell the Committee how frequent your ventilators are, and in what way it is done?—In Victoria-street and Queen-street the ventilating shafts or openings are about 25 yards apart, I believe, or thereabouts; they consist of openings covered by gratings.

120. *Chairman.*] In the crown of the arch?—In the crown of the arch.

121. Mr. *Cripps.*] How are they covered over?—With iron gratings.

122. You said that the water pipes and gas pipes have been laid there; will you tell the Committee in what way the gas and water pipes are laid in your subways; have you a diagram which shows how the pipes are laid?—I have not, but I think I can explain it quite easily; the pipes are simply laid on the floor of the subway; I should explain that in Victoria-street, which is rather different from those in London, the floor of the subway, one-half of it, is tiled or paved with flags, and

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and in the centre there is a channel, and upon this tiled floor the water pipe is laid. The object of the flooring being laid with stone, and the channel being there, is that in case of any escape of water from the water pipe taking place, either from a joint, or while the service is being laid, it may simply run into the sewer straight away at once; if the whole main be either expanded or contracted, or anything of that sort from any cause, or be broken with a blow from a hammer, the whole of the escape of water might run through the openings in the subway.

123. Viscount *Galway.*] Where is the drainage of the upper water, the rain water to go?—That passes off from the streets through gratings in the surface of the streets in the ordinary way. There is a gully in the street, or cesspit, and there is a grating next the kerbstone in the usual manner, that takes the rain water away from the surface of the street. That is passed down one of these subways, and then along the floor of the subway, as shown here, into the sewer.

124. What is the width of the sewer?—Three feet high and two feet wide.

125. Mr. *Duff.*] The pipes are simply laid on the floor of the subway?—Yes; on the floor of the subway.

126. Mr. *Cripps.*] You said that you found no inconvenience or difficulty, by yourself or your men; have you ever had any complaints from the companies themselves who have laid pipes there as to any inconvenience to them resulting from the operation?—We have not.

127. Neither the gas nor the water companies?—No.

128. Have you had any communication with their officials, to know whether they are satisfied?—I have constantly seen their men at work in the subway, and I have heard expressions that there is no difficulty whatever.

129. They have never complained to you?—No; not at all; never. Our men have often been at work at the same time making connections with the sewers.

130. I believe that since that in 1863, when these pipes were laid there, the Corporation of Nottingham have made another street?—They have.

131. That is what is called Lister Gate, is not it?—It is.

132. When you made that new street, was a subway made there for that street?—Yes.

133. How long was that new subway which was made in Lister Gate?—About 400 feet, I think.

134. Was everything done to render that subway as convenient for the gas and water companies as those have been in Victoria-street and Queen-street?—Yes; it was made somewhat on the same principle, but with a considerable improvement. I can show it by means of this diagram.

135. *Chairman.*] Will you explain it shortly?—I should state that Lister Gate is the greatest thoroughfare in Nottingham.

136. Mr. *Paull.*] Is that where the subway is?—That is where the second subway was made in 1865.

137. *Chairman.*] You say that it was about 400 feet long?—Four hundred and fifty feet long. This is a section of the construction of that street (*exhibiting the same*). The subway here consists of a simple archway; the sewers are double in this instance, to get sufficient sectional area, as we were limited by the height of the sewers.

138. Viscount *Galway.*] Double sewers?—Yes; double sewers; that was simply as a matter of convenience and engineering arrangement; this subway is flagged on one side, and the grates are placed at intervals as shown there; the water passes off from the water-pipe, if any leakage takes place, at once into the sewer.

139. *Chairman.*] To that channel?—Yes; into that channel.

140. Mr. *Floyer.*] What is the height and width of that?—This is 10 feet wide, and 6 feet high.

141. Viscount *Galway.*] What is the nature of that soil?—It is a sort of alluvial soil there, overlying the red sandstone; we were not in the red sandstone; we were in the alluvial soil.

142. Was there any difficulty in getting a foundation?—Yes; we had some difficulty, we had to concrete very considerably; it is the valley of the Trent, which overlies the red sandstone, and we had to construct subways through that.

143. Mr. *Cripps.*] When was it that you completed that subway and requested the

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the gas and water companies to come into it as you had into the other streets?—In 1865.

144. Then, in the meantime, between 1863 and 1865, was the time when the inquiry had taken place about the London subways?—Yes; that was in 1864.

145. When you made application to the gas and water companies of Nottingham again in 1865, did you then find that they had a difficulty in coming in?—On the conclusion of this work, we made an application to the gas and water companies to lay their pipes as before, and we were told by them that there was considerable danger, and therefore they declined to do so, but they said in the course of a communication, which I can give if necessary, that if the Corporation could give them some indemnity in case of any risk or danger, they might be disposed to reconsider their decision.

146. I believe Mr. Hawkesley was the adviser to the Nottingham gas and water companies?—He is their engineer.

147. And he had been, I think, also in the first instance in 1863, when the pipes were laid down?—I believe he has been their engineer for the last 20 years.

148. I dare say you are aware that he was one of the witnesses who was called and gave evidence for the companies in 1864?—Yes.

149. Was the result that the water companies refused altogether?—Yes; the water companies refused point blank, without any explanation whatever.

150. Without assigning any reason?—Yes; without any reason whatever.

151. Was the consequence of that that, although you then had made your subway, the gas and water pipes were laid down in the street upon the old plan?—The gas and water companies after the street was consolidated, cut each two trenches, which makes four, down the paved street, and laid their pipes in the usual manner; the telegraph companies laid their wires through the subway, upon an application being made to them.

152. *Chairman.*] In this case there is a telegraph in the subway?—Yes.

153. Does that apply to Victoria-street as well?—No; it only applies to Lister Gate.

154. Mr. *Cripps.*] I believe after that the Corporation again had occasion to make a new street, or an improvement of a street?—They had, in the next year.

155. That was in Market-street?—In Market-street.

156, When they made that, did you still persevere there, and make your subway in Market-street the same as the other?—Market-street was made under similar conditions to Victoria-street and Lister Gate; it was a narrow old street widened in the very centre of the town, and when the property was purchased, and the works were in course of construction, the matter came before the Council of Nottingham as to whether this system should be pursued in Market-street. The companies having refused to lay their mains in Lister Gate, the Corporation, I believe unanimously, my impression is that it was perfectly unanimous on the part of the Corporation who were 56 in number, resolved that the subway should be made as before.

157. *Chairman.*] What is the length of it?—The same length as the other, but narrower.

158. Viscount *Galway.*] What plan is that?—That is the plan of the street when widened, and shows the manner in which the subway was made. This is the contractor's plan, which bears the signature of the contractor, on which plan it was made. This is Market-street; this is Sheep-lane, which is well known in Nottingham; that is a section of the works in that street, Market-street.

159. There you have only one sewer?—There we have only one sewer; there the subway is only eight feet wide, in fact, wide enough for all the purposes of that street if the mains were laid. This is more extensively ventilated than the other. There it requires no artificial light to pass along this subway at all.

160. Is the height the same?—It is about six feet six.

161. *Chairman.*] You mean that the natural light admitted to the subway is sufficient?—I mean that the light from the outside is sufficient to light up the subway inside. It is perfectly straight, and you can see from one end to the other.

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162. What is the length of it?—About 450 feet.

163. When was that made?—In 1866.

164. Is that in operation?—The gas companies and the water companies refused to use it, and the pipes were laid in the street, and the subway is vacant, with the exception of the drainage of the sewers and the branch drainage. The Corporation unanimously determined to make the subways, notwithstanding the companies had in Lister Gate refused to use it, they felt the necessity of it so great in this densely populated portion of the town.

165. Mr. *Paull.*] They refused before the second subway was commenced?—They were not asked with respect to this Market-street subway; they refused on the completion of the Lister Gate.

166. So that they had had experience of two subways?—No; only of the first subway.

167. This was your third subway?—Yes.

168. Mr. *Cripps.*] They had had no experience of the second subway because they refused to use it?—Not of the subway in Lister Gate; in Victoria-street and Queen-street they had.

169. Mr. *Paull.*] Was it before or after the construction of the second subway that they refused to use the second subway?—After we had constructed the second subway they refused to use it.

170. Did you apply to them prior to commencing to construct the second subway, as to whether they would use it?—I am not quite sure about that.

171. Viscount *Galway.*] There is no telegraphic wire in this third one?—Not in the third one.

172. Mr. *Cripps.*] I understand you, so far as the gas and water companies are concerned, they had been using the first subway you made up to the time that you applied to them to use the second?—Yes; they had.

173. And no difficulty had arisen, and no complaint was made?—Not at all, that I am aware of.

174. During that interval the inquiry had taken place here?—Yes.

175. Mr. *Paull.*] Was it prior to the construction of the second subway, or subsequent to its construction?—Lister Gate was opened in July 1865, and I have a letter here from the Nottingham Gaslight and Coke Company, dated the 29th of August 1865, refusing to use the subway.

176. Was that in the nature of a notice that if constructed they would not use it?—I am not aware.

177. When was that letter written, before or after the construction of it?—After the completion of the subway.

178. Viscount *Galway.*] There is a third step; you proceed to make the Market-street subway, you say, notwithstanding the refusal of the gas and water companies to use the Lister Gate, which was No. 2, the Corporation determined notwithstanding that, to make that subway in the third place?—Yes.

179. Mr. *Paull.*] What I wish to ascertain, is the period when the gas and water companies refused to avail themselves of the subway?—On the 29th of August.

180. Viscount *Galway.*] That was in 1865; but with regard to Market-street, the one in 1866, the Honourable Member wants to know when did they refuse to lay either the gas or the water pipes?—They were not asked before the subway was made in Market-street.

181. Mr. *Paull.*] As to the second subway, the second subway has not been used?—No.

182. Was the 29th of August prior to the construction of the second subway, or after?—After the completion of it; two or three months after the completion of the works, at the time the street was opened for traffic. I am not aware of any previous communication having been made, that is to say, prior to making the subway, I am not aware of any.

Mr. *Denison* will you just read that letter.

183. *Chairman.*] By whom was it signed?—By the clerk of the company.

184. Mr. *Paull.*] The 29th of August was subsequent to the construction of that subway?—Yes.

185. Will you now read the letter?—"Dear sir, I have laid your letter of the 10th instant, and its accompanying copy report, before the directors of the gas company,

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company, and I am instructed, in reply, to say, that after mature deliberation the directors have very reluctantly come to the conclusion that they cannot, prudently, accept the responsibility of complying with the request of the Corporation with reference to the placing of the company's mains in the subway in Lister Gate and Low-pavement; the directors are advised that all the new facts only confirm the conclusion at which they had previously arrived, of the great danger which would result to the public, as well as the interests of the company, from the introduction of gas mains into a subway; that an explosion would, in that case, sooner or later, happen, most probably with great destruction of life and property, there seems no reason to doubt, and a very grave responsibility would in consequence, most assuredly, rest upon the company; it is a very significant circumstance that, since the inquiry before the House of Commons, there has been an explosion, attended with loss of life, in the one remaining subway with gas pipes, in Paris. I am also to remind you that the Corporation have constructed the subway in question, after, and, notwithstanding that Parliament had, after full inquiries, refused to give the Metropolitan Board of Works power to compel the Metropolitan Gas Companies to lay their mains in subways, and after the Corporation had full knowledge that the gas company entertained a decided repugnance to encounter the risks and liabilities consequent upon placing their mains in subways. It is also worthy of observation, that so unsafe do the company's workmen feel in the Victoria-street subway, small and little used as that work is, that they decline to enter it unless they are protected by having the gas shut off at both ends of the street; a condition impossible to be complied with in the case of trunk mains, and which it will be impossible to continue, even in the case of Victoria-street, if gas should be consumed by the occupiers of houses in that street in the daytime. In my letter of the 13th March last, a mode of laying the pipes of the company, so that no subsequent interruption of the thoroughfare should result, was pointed out, and the directors consider that the company's mains should be laid in that way, as being on the whole the most convenient and safe manner in which their operations can be conducted in the thoroughfare in question. The directors desire me further to say that they would have been very glad if they could, consistently with their duty to the public, and the company, have complied with the wishes of the Corporation; and that it is only after the most anxious consideration that they have come to the conclusion that they would not be justified in acceding to the request of the Corporation to try what is admitted by them to be an experiment, and which the directors respectfully submit ought not be tried at the risk of the company. If any mode can be suggested as verbally intimated by you, by which the company could be satisfactorily indemnified and protected against any risk, responsibility, or loss, the directors might re-consider their determimation." In consequence of the receipt of this communication a deputation was appointed.

186. *Chairman.*] That is the conclusion of the letter?—Yes.

187. Mr. *Paull.*] That was in 1865?—Yes; a deputation waited upon the directors at a special meeting convened for the purpose of receiving them, accompanied by the town clerk and myself, and in consequence of that letter, with respect to the indemnity, we undertook on the part of the Corporation that they should indemnify the company against all moral and pecuniary responsibility, and take the works exclusively into the hands of the Corporation, if they would permit the mains to be laid in that street; we discussed the matter, and we thought that they had agreed to our arrangement; but a day or two afterwards a letter came refusing altogether to adopt our proposals, and in consequence of that the street was opened and the mains laid as usual.

188. Mr. *Paull.*] May I ask what was meant by "moral and pecuniary" responsibility?—It was thought there being on the part of some people doubts as to the danger that the Corporation might be considered to be rushing into danger, but they felt so satisfied of the non-existence of that danger, that they thought any moral responsibility that might accrue to them they would be safe in taking upon themselves.

189. Am I to understand you to say that the authorities of Nottingham were prepared to undertake any liabilities in respect of damages in respect of damages, supposing actions were brought for explosions, and so on?—They were prepared to take the responsibility; they offered to the directors to accept the pecuniary responsibility of any danger that might arise; and, in consequence of their strong feeling in that direction, as I informed the Committee before, the refusal

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of the directors to use the subway in Lister Gate, the council deliberately, at a special meeting, decided to construct, and they have constructed, the subway in Market-street; that is the third improvement.

190. Do you know if the ratepayers were consulted with regard to the propriety of entering into such a covenant as that?—The ratepayers were not consulted by the Council; I believe that the Council enjoy the confidence of the ratepayers.

191. Though they may enjoy the confidence of the ratepayers in respect of dealing with the rates that they levy for ordinary purposes, do you think that the ratepayers would have been willing that the Corporation should give an indemnity against actions in cases of damage?—There has been a strong feeling on the part of the public in Nottingham, that the gas companies have not behaved well in the matter; I think there is no doubt if the public were canvassed, there would be found to be a very strong feeling against the action of the gas and water companies in respect of these subways.

192. Supposing there had been a great explosion, would the Corporation of Nottingham have been prepared to pay 10,000 *l.* or 15,000 *l.*?—Those were the terms offered to the directors at the time.

193. And they refused to accept them?—Yes.

194. Do you know why they refused?—I do not know; we heard no more from them.

195. You did not hear that it was because they doubted the right of the Corporation to enter into such a covenant, or to so appropriate the rates?—I am not aware of that.

196. Viscount *Galway.*] You have stated that so strong was the feeling of the Corporation with respect to the desirability of these subways, that they were unanimous in acquiescing in the construction of the subway in the third case, *i.e.*, Market-street; do you happen to know whether they were unanimous for its construction in the second case, Lister-gate?—In consequence of the directors refusing to accept the responsibility, the matter was never fully discussed in the Council. The Improvement Committee of the Council have had the sole conduct of these large improvement works, widening streets, and so on.

197. How many members does the Improvement Committee consist of?—I believe 13; the Mayor is the chairman.

198. *Chairman.*] They were unanimous, you say?—Yes; the Improvement Committee have always been unanimous.

199. Mr. *Cripps.*] After that refusal on the part of the directors, have the pipes notwithstanding remained down where they were originally put?—The pipes in Victoria-street are where they were originally laid.

200. There has been no application to remove them?—No.

Cross-examined by Mr. *Denison.*

201. Is Victoria-street flat or on a slope?—On a slope.

202. A steep slope or a little slope?—One in 17.

203. The diameter of the gas pipe there is what?—I believe it is five inches.

204. Do you not think it is four?—It is either four or five; I think I stated five inches in 1864.

205. Will you look and see whether it is four or five; I have one passage in the evidence in 1864 stating that it was four inches?—I have not it here; I am under the impression that it was five inches.

206. Do you mean inside or outside?—Inside.

207. About the ventilation, what is the mode of ventilation there?—By openings in the arch. (*The Witness handed a section to the learned counsel.*)

208. These things are sewers?—Yes.

209. There is no difference of level on each side of Victoria-street?—This shows the original plan; in execution one side was kept higher than the other.

210. The gas pipe is on a high level and the water pipe on a low level?—Yes.

211. What does the water pipe rest on?—Flags.

212. And what does the gas pipe rest on?—On sand or soil.

213. Why

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213. Why is the gas pipe put on sand or soil?—We had no reason for flagging it; the other was flagged in order to provide for any leakage.

214. You put it on the sand because you had no reason for flagging it?—Yes.

215. What is the bottom made of; is it merely the natural soil?—And concrete over the sewer.

216. If they wanted to get to the bottom of the pipe, how would they do it?—They would have to remove the sand under the joint.

217. And pick a hole in the concrete?—No; the sand is sufficiently deep.

218. How deep is it?—Five or six inches; five inches would be the average.

219. And a 5-inch pipe?—I think a 5-inch pipe; it may be four, but I always had the impression that it was five.

220. How many of these openings are there in 100 yards?—About four.

221. The whole thing is 183 yards?—There is one at each end.

222. Am I right that the whole length of the thing is 183 yards, or is that two streets?—That is two streets.

223. Give me them separately?—The Victoria-street would be about 450 feet, the other one would be about 100.

224. The longest in one run is 450 feet?—Yes.

225. And in that there are four openings besides the two ends?—About six openings I should think, altogether.

226. What is the size of the water pipe there?—The water pipe is the same size as the gas pipe.

227. Are there any cross mains connected with either of the pipes there?—No; no cross mains.

228. And how many services?—A large number of services.

229. What sort of number; if I remember rightly, there are only houses on one side of the street; I think we were told that in 1864?—The whole of this side (*pointing to the section*) is built up with the exception of a small piece at the corner; here (*pointing it out*) there are shops and warehouses, and so on; a portion of the street there is built over; a club house is building at the bottom, and the new post office is building at the top there (*pointing it out*); on this side it is totally built up.

230. Which is the subway on the plan?—There (*pointing it out*).

231. What number of services is there, is there one for each block?—One for each property varying from three-quarters of an inch to two inches.

232. Cannot you tell me what number altogether?—Fourteen or fifteen.

233. That is what you mean by a great many?—I can give you the exact number.

234. I am content with 14 or 15. One of those pipes being on the right side of the street and the other on the left, the services have to cross; that is, if the gas pipe is on the right side of the street, and the water pipe on the left, the services of water on the right have to cross the gas pipe, and the services of gas to the left have to cross the water pipe?—Yes; over or under; the gas pipes are over, and the water pipes are under; the water pipes are lead, and the gas pipes are iron.

235. The water services go through the sand just above the concrete under the gas mains?—Yes.

236. Viscount *Galway.*] Is there anything between the two pipes?—No; one is here (*pointing it out*), and another there. The service from the water pipe has to travel over or under the gas pipe, and conversely with the service from the gas pipe.

237. When it goes over or under the gas pipe, what is between the two pipes?—Nothing whatever.

238. Is there any space?—Two or three inches.

239. One does not rest upon the other?—No; there would be a space between.

240. What is in that space?—It is an open space; the service pipe is supported at intervals on blocks of stone, and secured to those blocks of stone; and, in passing along, if you did not happen to see the pipe at the moment you would not disturb the pipe.

241. Mr. *Denison.*] You said something about temperature, did you say it was very uniform?—Very uniform.

242. At what rate does it stand?—I will give you a very good idea by giving

you the temperature of the subway during the severe frost of last winter, when the temperature was 29, 26, 29, 20, and so forth, up to 30, the temperature of the subway was uniformly about 43 degrees; and I have also the temperature taken this month, the external air being 55·25 to 62·75, the internal reading varied from 58·75 to 59·25.

[*The Witness handed in the following papers*:]

Relative Gaugings of Temperature on the Floor of "Victoria Street Subway," and the Ground Line outside same:—

January, 1867.

Date.	Time.	Reading in Open Air.	Reading in Subway.	Difference.
January 14 - - - -	1.30 P.M.	29·25	43·75	+ 14·50
" " - - - -	3.0 P.M.	26·25	43·25	+ 17·00
" 15 - - - -	9.0 A.M.	20·00	43·00	+ 23·00
" " - - - -	1.30 P.M.	29·25	43·00	+ 13·75
" 16 - - - -	9.30 A.M.	29·00	43·25	+ 14·25
" " - - - -	4.45 P.M.	29·25	43·50	+ 14·25
" 17 - - - -	9.15 A.M.	27·00	43·25	+ 15·25
" " - - - -	3.0 P.M.	27·75	43·25	+ 15·00
" 18 - - - -	10.5 A.M.	30·00	43·25	+ 13.25

Relative Gaugings of Temperature on the Floor of "Victoria Street Subway," and Open Air outside ditto:—

June, 1867.

Date.	Time.	Reading in Open Air.	Reading in Subway.	Difference.
June 14 - - - -	9.0 A.M.	56·75	59·00	+ 2·25
" " - - - -	3.10 P.M.	58·00	59·25	+ 1·25
15 - - - -	9.0 A.M.	55·25	59·00	+ 3·75
17 - - - -	1.30 P.M.	58·25	58·75	+ 0·50
18 - - - -	9.10 A.M.	62·75	58·75	— 4·00
19 - - - -	10.15 A.M.	55·50	59·00	+ 3·50
20 - - - -	10.0 A.M.	59·50	59·00	— 0·50

243. Have you got it in very hot weather?—Not higher than 62·75, when it was 58·75 in the subway.

244. Has it occurred to you to calculate the variation in length of any long line of pipe corresponding to the difference of temperature in the pipe, as shown by

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by those tables?—Yes; very often. I have not done so in regard to these pipes.

245. What is the variation in proportion to any number of degrees for any given length?—The difference of so many degrees of Fahrenheit would produce an extension in the length of the iron which I cannot remember at this moment.

246. We may take that from any scientific book?—Yes.

247. You have not given us, except so far as this plan gives us, the depth underground from the surface of the street to the bottom of the subway?—About nine feet.

248. *Chairman*] Does it differ very much?—Not at all.

249. It follows the natural line of the street?—It is uniformly a parallel line with the street.

250. Mr. *Denison.*] Are there in that short length of main any cocks for turning the water on or off?—

Chairman.] Is it constant supply?

Witness.] It is constant supply.

251. Mr. *Denison.*] Then, I suppose, you have not such things?—Yes; there is a hydrant by which you can shut the water off.

252. Is there one in the subway?—Yes.

253. How is that worked?—In the subway.

254. You go into the subway?—Yes; the water company can turn the water off outside as well.

255. Is there a shaft that goes from the pipe into the street?—No; you have to go into the subway, but they can turn it off outside as well by shutting off the hydrant.

256. That is outside the subway?—Yes.

257. So far as the pipe in the subway is concerned, they have to go into the subway to do that?—Yes.

258. Will you point out where the pipes are on this plan (*the Witness pointed them out*). What is the height from the soffet of the arch to the surface of the road?—Two feet six.

259. That is bricked up?—Except at those openings.

260. The pavement lies on this ring?—It does very nearly on the arch where those places do not occur.

261. Where they do occur, the paving stones lie upon the top of this ring?—Yes.

262. The first of these subways, the Victoria-street one, was made in 1861, and the pipes were laid in 1863?—Yes.

263. You say that the company behaved ill in refusing to go into your second subway?—I thought so.

264. Do you know what they said about it in 1864?—I do, from the Blue Book.

265. Mr. *Rodwell.*] You mean Mr. Hawksley's evidence?—Yes.

266. Mr. *Denison.*] Are you aware that Mr. Hawksley said this, besides a good many other things about it, "I think this will be the last of the subways that will be made here, and that by complying in this case we may get rid of all the unpleasantness of discussion, and at the same time have no future difficulties." Are you aware that the Mr. Hawksley gave that as the reason why he consented, for the sake of peace and quietness (as the Chairman said) in 1864, to go into that subway?—I have read that.

267. You knew that?—I have read that.

268. Attend to my question; you knew that?—I knew that Mr. Hawksley objected to subways.

269. Did you know that Mr. Hawksley, in 1864, before you made the second of those subways, had said this which I have read?—Yes.

270. And yet you say you were surprised, and thought they behaved ill. You knew that he said this also (here I see is the 4-inch question). He is asked: "You could not have had much idea of the danger of blowing up?" And he says: "With a 4-inch pipe and a subway of 170 yards long, and a difference of level of 27 feet in so short a length, of course, the risks were reduced to a minimum. I do not say there is no risk, because I believe there is, and I have frequently stated, with regard

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regard to that subway, that some day or other they will have an explosion, and then there will be an end of the whole business; but I do not think it is a very material thing at all;" you knew that he had said that; did you?—Yes.

271. Mr. *Rodwell.*] That was when the second subway was suggested?—Yes.

272. Mr. *Denison.*] No; let me try again. How soon did you know that Mr. Hawksley had said this?—Directly after.

273. And therefore, necessarily before you began making this second subway in 1865?—Yes.

274. I observe in that letter of the 29th August 1865, the gas company refer to a previous letter of the 13th of March, have you got that with you?—I have no other but that.

275. Was not there a reference to a letter of the 13th of March?—The town clerk has communicated with the gas company on one or two occasions, but I do not know the dates.

276. Am I right in thinking that there is a reference in that letter to a letter of the 13th of March; just read that piece of it again?—"In my letter of the 13th March last," I do not know what that refers to; I had about that time, probably a communication with the engineer of the company, the local engineer, and he suggested at that time that the pipes should be laid on the side.

277. That sounds as if it had reference to this very question?—I can get the letter no doubt if there is one; I know what it refers to; it was suggested by the local engineer that the pipes should be laid not in the subway but close to the kerbstone.

278. That you knew on the 13th of March?—Yes.

279. That was said not by Mr. Hawksley, but the engineer?—I believe it was mentioned to me by the local engineer, in fact it must have been.

280. Before we come to the indemnity question, was there a question made of charge between you and them?—There never has been any question about charge.

281. You offered to let them come in gratis, you offered them besides an indemnity; but notwithstanding that, they having the knowledge they had, declined to come?—Yes.

282. Have you taken pains to inquire into the accident that Mr. Hunt refers to in that letter?—Not personally.

283. Now as to the indemnity, did you ever get so far as to get on paper any form of indemnity?—I think not; the negociation took place at a meeting of the directors at their offices.

284. I do not know all your local Acts of Parliament, but what power is there in your Corporation of Nottingham to take any such liability upon themselves, and what chance is there of its being allowed in their audit of accounts?—I cannot answer that.

285. You do not know of there being any special power in the Corporation of Nottingham to do that?—I do not.

286. So much for the pecuniary part of the indemnity; but supposing two or three people were killed, what about indemnity then; how do the Corporation propose to deal with that; is the Mayor to be hung?—I presume if a person were killed, if the Corporation had power to give an indemnity they would have to deal with it in the same way as any company would.

287. You mean under Lord Campbell's Act?—I cannot tell you what would be the result if a person was killed.

288. You did not merely talk of pecuniary liability, but you voluntarily used the phrase "indemnity against all moral and pecuniary responsibility"?—I explained that with reference to the position of the Corporation with regard to the public.

289. That was the "moral" part of the business?—Yes.

290. That is all the light you can throw upon the transaction; as far as you know they have no special power, and you have explained what you mean by "moral" indemnity?—Yes; I mean that the Corporation feeling the importance of the subject, and wishful to test the system as far as possible, offered all they could, and as a portion of their offer they undertook to make good any damage that might occur.

291. They can only make good pecuniary damage?—Exactly.

292. When you offered them to come in, or tried to tempt them to come into the subway gratis, and also offered an indemnity, you did so because I suppose you

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you think on the whole that is the fair way of treating it?—I think if the Corporation had at their request had the mains placed in the subway, under those circumstances, they would be doing nothing but fair if they took all the responsibility.

293. My question is this, as the Corporation offered to take them in gratis, and offered besides an indemnity to go in, I suppose they did it because they and you and their officers thought it was a fair way of treating the thing?—Quite so.

Re-examined by Mr. *Cripps*.

294. Were you present when this interview took place between the Corporation and the company?—I was.

295. Do you recollect whether the company suggested as their season for declining the offer of the Corporation, that the Corporation had not the power to offer it?—Nothing of that kind was stated at the interview, whatever might be the feeling of the company privately I cannot tell.

296. So far as you heard, that was never alleged by the company as the reason why they did not accept the offer of the Corporation?—Not to my knowledge.

297. The Corporation were willing, so far as they could, to offer an indemnity?—As far as they could they proposed to do so.

298. The question as to the ratepayers could not occur, because the offer was not accepted in the first instance?—Quite so.

299. With regard to what was stated by Mr. Hawksley in 1864, which you say came to your knowledge shortly after he had given his evidence, he had been the engineer of the companies in 1863?—Yes.

300. Had you ever heard the objections which he made in giving evidence for the companies, before the Committee here, when he was at Nottingham, or before that time?—Not officially; in the course of conversation with him one day, long subsequently to the pipes being laid in Victoria-street, I ascertained that he had objections.

301. When the pipes were laid, did he object at that time at all?—Not that I am aware of.

302. When was your interview with him; was it after he had given his evidence here in 1864?—A long time before; it was simply a conversation.

303. You say that when the cocks are to be turned, some one must always go into the subway; that has been always done?—I do not think that is necessary.

304. They have done it?—Yes.

305. Persons go down frequently into the subway for that purpose?—Yes.

306. Where those gas and water pipes cross at right angles, they do not touch at all, do they?—No.

307. There is a space of about two inches?—Yes; two, or three, or four.

308. Mr. *Bagwell.*] You state in your evidence in 1864, that in Victoria-street and Queen-street there was a length of about 530 feet of this subway; that 530 feet of subway had gas pipes and water pipes in them?—Both.

309. You were asked in question 1350, "Have those arrangements been found in practice perfectly successful?" and you answer, "They have up to the present time been perfectly successful; we have had no leakage from the gas or water pipes; we have had no smell in the subways, and the ventilation has been considered perfectly effectual up to the present time." That being your answer three years ago, do you now, with three years' further experience, give the same reply?—My answer would be the same at the present moment in stronger language, because I have often seen connections made with the pipes in the subway. I have seen connections made with the mains fully charged with gas, and with the naked gas light.

310. So far as you can judge by the experiment of 530 feet, if instead of 530 feet you had five miles of subway, would your answer be the same; do you think that 530 feet is a sufficient experiment to warrant you in giving an opinion upon the state of things in a subway a mile, or three or five miles long?—As a matter of opinion, I consider a length of five miles may be as easily and safely kept in proper condition as the length we have. I see no practical difficulty.

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311. The electric wire does not go through that length of 530 feet?—No.

312. If the electric wire went through would there be any danger?—I am not aware that any danger would be likely to arise from that; I never knew an instance of an electric wire firing anything.

313. Would it be a safe thing to have an electric wire go through a barrel of gunpowder?—I cannot answer that question at the moment.

314. If anything broke it, would not it be likely to explode the gunpowder?—If anything broke the wire there would be an explosion; I presume, if the wire were intact all the way, there would be no danger.

315. Mr. *Paull.*] Was it upon your advice, as engineer, that the Improvement Committee of Nottingham were prepared to recommend that the indemnity should be given?—I do not think I was consulted upon that at all; our committee, two or three members of it at any rate, who were most active upon it, have taken an equal interest in the question with myself, and they of course consulted the town clerk; I am not aware that I was specially appealed to in that particular matter.

316. Then it was rather upon the evidence of their senses than any scientific evidence as to the possibility of explosions that they recommended that an indemnity should be offered?—I think so; the guarantee referred to you will at once perceive was in consequence of the suggestion thrown out in the letter of the gas company, which I have read.

317. The gas company was of opinion that the danger from explosion was so great that they ought not to undertake that responsibility?—Yes.

318. And the Improvement Committee, as I have said, upon the evidence of their own senses rather than on any scientific evidence, were prepared to give the guarantee?—Quite so.

319. As an engineer with scientific knowledge, would you have been prepared to join in recommending that indemnity?—If the Corporation could have had the whole charge of the whole works in the subway, of course, under those special circumstances, we should require an understanding that we alone should take charge of the works in the subway.

320. You think that the danger is so remote that but for negligence no accident would result?—I think so; that but for negligence no accident would result.

321. I presume you admit that the introduction of gas pipes into a subway is an experiment only?—It is, of course, experimental, as far as we have gone.

322. It was because it was an experiment that you thought it was fair for the Corporation to consent to indemnify the gas company against accident?—It being experimental, and the company referring to it as being experimental, the committee thought it reasonable to undertake the responsibility.

323. Is it still so far experimental that, in your judgment, it would be reasonable that the authorities who should obtain power to require gas companies to lay down their pipes in subways should give an indemnity against accident?—I do not see that an indemnity would be reasonably called for, providing that the gas and water companies had the charge themselves of their pipes in the subways. I want it to be distinctly understood that I think the responsibility should rest upon those who have a direct interest in the works and mains. It would be obviously unfair for the companies to lay down pipes of that kind in the subway, and call upon a second party to take the responsibility of them.

324. If the parties to whom the pipes belong are of opinion that danger might follow from introducing those pipes, do you think that they ought to bear the responsibility of any accident that might result. You told the learned counsel that you thought it was so much a matter of experiment that it was fair for the Corporation of Nottingham to consent to guarantee the gas company when they required to be indemnified?—I stated, that because the gas company themselves, in their letter, threw out the difficulty that the thing was altogether experimental, and being wishful to prove the practicability of the scheme, the Committee, I think, properly, in this particular instance, offered to take the responsibility of it, but, of course, as I have said, under those circumstances it would be only fair for us to have the whole management of the works in the subway.

325. Supposing that given, do you think it reasonable that the gas companies should require to have an indemnity against accident, seeing that the matter is still so much of an experiment?—I do not consider the matter in the whole to be

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be so much of an experiment now as it then was. I think that if the gas companies had the privilege, because, of course, it is a privilege, to a great extent with them, to have access to their mains, and to have all the benefits which accrue from the use of the subways, I think they should take all the responsibility.

326. What has made an impression upon my mind, and it is upon that that I am examining you is, that the gas companies were fearful of the accidents that might occur, and you, as a professional man, were so far of opinion that they were justified in those fears that you thought it right that they should be idemnified against the possible danger?—I meant in that particular case; I was anxious that the pipes should be laid in the subway, because the objections have been so numerous in London against the use of subways that I was anxious to pursue the experiment to the fullest possible extent; therefore, I say, under those circumstances, I do not think it would have been unfair for the Corporation to indemnify the companies.

327. With the further experience which you have gained since you entertained that opinion, do you think such an indemnity now unnecessary?—I think so altogether.

328. Why do you think it unnecessary?—First, because I consider there is no danger if the pipes are properly and diligently looked after and examined from time to time, and placed under the care of a competent officer. If the gas company, or the water company, or both, use a particular subway, such as the one in Southwark, here, of course, employing proper officers for the purpose, and they ought to have the sole control of the works in the subway. It is a matter of opinion, of course, fortified by as much experience as we have had, how far the pipes are free from danger.

329. In spite of all that care, escapes of gas might take place?—Escapes of gas might take place.

330. Are you of opinion that ventilation, by means of gratings at 60 feet apart, would be sufficient to afford complete ventilation?—I should make them as I have done in the Market-street subway, much closer together; sufficiently so, as I before stated, to even light the subway internally; I have placed a burning piece of brown paper on the floor of the subway, and the blue smoke of the burning paper has drawn right away rapidly up to the ventilator.

331. The gas pipes, as I understand, would be laid on the floor of the subway?—Yes.

332. Would there not be conditions of the atmosphere in which it would be so much denser than the gas, that the gas would not rise through it?—The gas, of course, being lighter than the atmosphere, would always have a tendency to rise.

333. Would not the atmospheric air, under certain circumstances, be so dense that it would prevent the light vapour rising through it?—It might in the case of fog; I have not observed any condition of the atmosphere which would tend to prevent the rising of gas.

334. Mr. Hawksley says in his evidence in 1864, "I should think upon the Thames Embankment a vast number of openings of one kind or another, both immediately over the subway and through the lateral chimneys, or whatever they might be called, could be formed; and I should think that those would be sufficient on all ordinary occasions, but they would not be sufficient when the internal air is colder than the external air, for it will always lie dead in the subway, being heavier, unless the subway is inclined, and then it will run down hill precisely like water, and come out below instead of coming out above." In other words, that the gas exuding from the pipes, would remain as a stratum beneath the denser atmosphere; if that be so, would any ventilation such as you describe, be adequate to clear the subways of the escape of gas?—I do not anticipate a state of things of that kind occurring, because the atmosphere in the subway, so far as I have ever tested it, is always higher than in the open air; as I have already stated, during the cold weather last winter, the difference between the temperature in the subway and that outside was very great indeed, internally it was 43, and externally it was 20.

335. There would be very little motion in the air in the subway?—There is very little motion on the floor, but there is a great current under the roof; I believe the air is almost motionless down below, hence the uniformity.

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336. And hence there would be a stratum of air rarely in motion, beneath which there might be a stratum of gas?—I do not quite see that.

337. Might not the condition of the atmosphere in the subways be such as to prevent the escape, even through the ventilating shafts of the gas that might escape in the subway?—I do not anticipate a state of things of that kind at all; I have very carefully investigated that, and I find that the current gradually increases from the floor to the roof; it creeps along the surface of the roof and is very rapid under all states of the weather under the soffit of the arch.

338. Viscount *Galway.*] You never have had anything of that sort occur in the subway?—We have not.

339. Mr. *Paull.*] If that were to occur, and if a stratum of gas were to accumulate beneath this denser atmosphere, the introduction of a light would produce a very great explosion, would it not?—If the mixture of gas and atmospheric air was sufficient to produce an explosion.

340. Mr. *Floyer.*] With respect to the Victoria-street subway, is there any other source of ventilation except through those openings?—No; except at the entrance gateway; that has an iron grating.

341. There is at one end a gateway perforated with holes?—Yes.

342. That would act materially upon the ventilation?—Yes; and we have similar gates in Market-street.

343. In a long length of subway you would be deprived of that mode of increasing the ventilation?—In a long length I should introduce galleries, having iron covers to them, so as to increase the draught at intervals all along the subway; in a long length I should increase them.

344. Viscount *Galway.*] You said the water company objected as well as the gas company?—They have objected.

345. Had the Corporation of Nottingham any meeting with the water company?—None whatever.

346. Did the water company send any letter to the Corporation, or at least to the parties making the subway, stating why they objected?—They simply declined, giving no reasons whatever. I have here a letter from Mr. John Rogers Brown, clerk to the water company, dated the 22nd of December 1865, in which he sends the following resolution: "At a special meeting of directors, held on the 22nd December 1865, it was resolved, that the application by the Corporation for laying the water main in Lister Gate subway cannot be acceded to, and that no water mains be laid in that, or in any other subway that may hereafter be made.

347. There was no communication subsequently?—No.

348. *Chairman.*] I understand from you that the water main lies on the paved portion of the subway, so that in case of a leak the water might run from it safely into the sewer?—Yes.

349. The gas main is laid on the soil or sand?—Yes.

350. And that sand is over the concrete?—Yes.

351. Are there any chairs to uphold the pipes, either gas or water?—The water pipes are laid on rests of wood sufficiently high to keep the flange of the pipe on the subway.

352. If I understand you rightly, when you proposed to make the Lister Gate subway, your experience and that of the Improvement Committee having shown you and shown them that gas and water pipes may remain in a subway under certain circumstances with safety, the Corpoaation made the offer that they would guarantee the companies against any accident if they had the control of the pipes themselves?—Yes; that is what I mean.

353. With regard to the mixture of gas with atmospheric air, have you ever made any experiment yourself upon that subject?—No.

354. Though you might be influenced by Mr. Hawksley's opinion, you know nothing of it yourself?—Not from any experiment.

[The Witness withdrew.

Mr. *Rodwell* applied to the Committee for an order for the compulsory attendance of three witnesses who declined to attend without such order.

[Adjourned to Tuesday next, at Twelve o'clock.

Tuesday, 25th June 1867.

MEMBERS PRESENT:

Mr. Bagwell.	Mr. Grove.
Mr. R. W. Duff.	Mr. Cornwall Legh.
Mr. Floyer.	Mr. Paull.
Viscount Galway.	Mr. Tite.

WILLIAM TITE, Esq., IN THE CHAIR.

Joseph William Bazalgette, Esq., called in; Examined by Mr. *Cripps.*

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355. You are the Engineer to the Metropolitan Board of Works, I believe?—I am.

356. Have you been their engineer from the time that the Board was originally constituted?—I have.

357. The Board were constituted, and you became their engineer in 1855, is not that so?—Yes; I had been previously engineer to the Commissioners of Sewers for nearly 20 years.

358. And since that time I believe you have had all their works under your superintendence?—I have.

359. That would include the main drainage, and the new streets which they had authority to construct?—Yes.

360. Among the new streets was Covent Garden Approaches one of the first they had authority for?—Yes.

361. And the power for Southwark-street was got subsequently, I think?—It was.

362. *Chairman.*] Garrick-street is the first?—Yes.

363. And Southwark-street is the next?—Yes.

364. Mr. *Cripps.*] Garrick-street is completed, is it not?—It is.

365. And Southwark-street?—That is also completed.

366. And you have authority to construct the Thames Embankment, and the streets there?—Yes.

367. In laying out the first street which you spoke of, which I will call Garrick-street, did you so construct it as to have a subway under it?—We did. I may state that at a very early period the especial attention of the Metropolitan Board of Works was directed to the inconvenience sustained by the continual breaking up of the streets for laying gas and water pipes. They thereupon took into careful consideration the plan of forming subways under those streets in which gas and water pipes might be laid in such a manner that the surface of the streets should not be interfered with in performing that operation. After offering premiums, and receiving a number of plans and different designs, and employing the first engineers of the day, at that time, to determine upon those plans, they fixed upon a plan for making the subways which were constructed in Garrick-street.

368. You say they employed the first engineers of the day; it was a sort of committee that was appointed, was not it, for the purpose of examining the plans?—Yes; a sort of committee to determine which was the best plan, and to whom premiums should be awarded, and to report generally upon the subject.

369. Just tell the Committee the names of the gentlemen who constituted the committee?—There were Mr. Robert Stephenson and Mr. Hawkesley.

370. Perhaps I had better read them to you; Mr. George Lowe?—Yes; he was one.

371. And Mr. Wyatt?—Yes.

372. Mr. Thwaites and Mr. Marrable?—Yes.

373. The then Lord Mayor, Mr. Cubitt?—Yes.

374. *Chairman.*] Was it Mr. Cubitt the Lord Mayor, or Mr. Cubitt the engineer?—It was Alderman Cubitt.

375. Not the engineer?—No.

376. Mr. *Cripps.*] I have it stated here that it was the Mayor, Mr. Cubitt?—It was Mr. Cubitt, the builder, who had been just appointed Lord Mayor, and was a member of the Metropolitan Board of Works.

377. *Chairman.*] Mr. Stephenson, Mr. Hawkesley, and Mr. Lowe, who is a gas engineer?—Yes.

378. Wyatt, the architect?—Yes.

379. Mr. Marrable?—Yes.

380. And Sir John Thwaites?—Yes.

381. And Alderman Cubitt?—Yes; and myself.

382. Mr. *Cripps.*] And they made a report, I believe, to the Metropolitan Board?—Yes; they did.

383. I believe some premiums were given by the Metropolitan Board upon what was done by the Commissioners on that report?—Yes.

384. You did not adopt positively any one plan, I believe?—No.

385. But selected from the different plans that were handed in?—Modified them, and produced a subway which we thought was the most simple and the most effective.

386. This is the "Report by the Committee appointed by the Board to consider the designs for subways in new streets in the metropolis, and to award prizes in respect thereof." That is dated 16th September 1857. "The Board having agreed to the following resolution, 'That prizes be offered for public competition for designs showing the best mode of laying out the surface and subsoil of the new street in Southwark, as an example of a first-class street, and also of the street in Westminster as a second-class street, showing the disposition of the private vaults, sewers, gas and water pipes, telegraph wires, with any parts of the soil appropriated to other useful purposes.'" "'That the details of this competition be carried out by the works committee.' Your Committee were appointed by the following resolutions:—'That the designs which may be sent in to the Board by the several competitors, showing the best mode of laying out the surface and subsoil of the new streets, and other particulars described in the resolution of the Board of the 16th January, be referred to a Committee of seven persons, consisting of four professional men and the Chairman, and two other Members of this Board, assisted by the engineer and superintending architect. That Mr. Alderman Cubitt and Mr. Wright be the members to be associated with the Chairman.' The professional members of your Committee were requested and consented to assist in the examination of the designs, in reply to the advertisement." Then they mention the designs that had been sent in. "Your Committee report that they have been assisted by J. W. Bazalgette, Esq., Engineer, and Frederick Marrable, Esq., Superintending Architect to your Board, and have unanimously awarded the several prizes as follows." And then they give the prizes. "The difficulties in the way of arriving at a satisfactory decision have been very great; no general principles were found to apply, nor was it possible either to approve or condemn all the parts of any of the designs submitted to competition. Your Committee have therefore selected those designs, which appeared to them to be most susceptible of such practical adaptations as would render them most generally applicable to the circumstances of the metropolis." That is signed, amongst others, by Mr. Hawkesley. I see you assisted the Committee in that investigation; did you subsequently carry out the subways in Garrick-street, according to the suggestions which had been made in that way?—Modified with qualifications of those suggestions, which Mr. Marrable and I thought desirable.

387. Will you be kind enough to describe to the Committee what those subways are?—In Garrick-street we constructed a subway, I think in the year 1861, being semicircular with a radius of 6 feet 6 inches, and therefore at the base it was 13 feet wide and 6 feet 6 inches high. This section represents it very well (*pointing to a diagram on the wall*), the subway there being 6 feet in height,

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height, and the base 13 ft. At every second house is a passage about 4 ft. high and 3 feet wide, which passes from the subway up to the front of the cellar of the houses. At a distance of about 80 feet apart are ventilators in the crown of the subway at Garrick-street, and in Southwark-street they are 100 feet apart. Underneath the subway is a sewer, with branch drains passing from the sewer to the drains of the houses; provision is made for carrying off the water draining from the subway into the sewers through gratings, which are not shown in that diagram. There is a prospective view of the work as it has been constructed.

388. *Chairman.*] As it was constructed?—Yes.

389. Viscount *Galway.*] What is the width between the bottom of the subway and the top of the sewer?—The depth there is shown to be about 18 inches, but that is very variable, because the subway is made level with the street, of an uniform depth below the street, whereas the sewer has a fall from the upper end to the lower end; it falls into some deeper sewer beyond, therefore it varies; that would be the nearest point of contact; it would become deeper all the way down.

390. Mr. *Cripps.*] You were assisting the Committee when they saw those plans; did they have several meetings, and take great pains in considering the matter?—They did.

391. And, also, did they consider the question as to the laying of the gas pipes and the water pipes in the subway?—Yes.

392. How it should be done?—Yes, they did.

393. *Chairman.*] Were all those gentlemen present at these inquiries?—Yes.

394. At these meetings?—Yes.

395. Mr. *Cripps.*] And all signed the report, did they not; I have not got the meetings on the different days; they all signed the report; you will see that by the signatures. Now, has anything at all been done with reference to the subway in the Thames Embankment?—Yes, a portion of it has been constructed; it varies in form a little; and it may be well to observe that whilst that section has been proposed for Garrick-street and Southwark-street, it does not follow that that section would be followed for all other places. It might be modified to adapt it to the peculiar requirements of different localities; for instance, if I were constructing a subway down Holborn or the Strand, probably I should propose subways of larger dimensions. Like sewers and all other works, they require to be designed for the peculiar position, and the circumstances to which they have to be adapted. Now, in the Thames Embankment, for instance, the section of the subway varies; beginning it at the south of the work, there it is 7 feet 6 inches high, and 9 feet wide.

396. Viscount *Galway.*] Do you mean that one of those made here is 7 feet high?—Six ft. 6 in. high in Garrick-street, and 6 feet in Southwark-street, and 7 ft. 6 in. in the Thames Embankment; that represents the section of the Thames Embankment, with the sewers below, the low-level sewer formed at the back of the embankment, the intercepting sewer, and above that the subway. Both of those form arches, buttresses in fact, to the embankment, while they help to give strength instead of making it all solid; the distance between the top of the subway and the bottom of the sewer is 18 inches as a minimum.

397. *Chairman.*] How much is the maximum?—Five or six feet; in some cases it may be more.

398. Mr. *Cripps.*] About how much of the Thames Embankment subways are constructed?—About four-fifths of them are completed in the Thames Embankment, but not in the Mansion House-street.

399. Are those crossways constructed so as to be clear of the cellars?—Yes, quite independent of the cellars.

400. I do not know whether you have pointed out to the Committee in what way you get the pipes into the house?—That red line represents the brick wall facing the cellar. The side passage comes up to that brick wall, and the pipe will be carried through that wall into the cellar, and so into the house.

401. *Chairman.*] By "cellar" you mean the vault under the street, I presume?—Yes.

402. Viscount *Galway.*] For coals?—Usually used for coal vaults.

403. Mr. *Cripps.*] At the present time Garrick-street, and Southwark-street, and the Thames Embankment are all the places where subways have been constructed, or are in course of construction, are they not?—They are.

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404. But you have also power, have not you, to make them in the other streets which are mentioned in the schedule of the present Bill; that is to say, the Victoria Park Approaches Act, the Metropolis Improvement Act, and the Whitechapel and Holborn Improvement Act; those are the other streets which you are empowered to construct?—Yes.

405. Having made your subway in the first instance in Garrick-street, were the pipes actually laid there for the gas and water?—They were.

406. *Chairman.*] When?—About the year 1861.

407. Mr. *Cripps.*] Are those the gas and water pipes of the company who supply with gas and water that particular district?—Yes, the Phœnix Gas Works and the New River Water Company.

408. Are the houses in that street at the present time supplied with gas and water by means of those pipes in the subways?—Yes.

409. And that has been going on from the time they were laid in 1861 down to the present time, has it not?—Yes.

410. Were they laid there in the first instance with the assent of the gas and water companies?—Yes.

411. Under your superintendence, I suppose?—Yes; I should state that they are laid just under the soil under the gravel, about six inches under the gravel in the subway, that being the wish of the gas and water companies.

412. Will you explain a little more fully the way in which the pipes are laid?—They are laid in this gravel; there are in that subway two five-inch gas pipes, and one six-inch water pipe; they are laid just in the gravel which is laid in the bottom of the subway; they are just covered.

413. At the present time does the gravel form the soil of the subway there?—Yes, artificially.

414. *Chairman.*] It is not paved?—No.

415. Viscount *Galway.*] What is the bottom of the subway?—Gravel that we have put in, lying upon concrete.

416. Mr. *Paull.*] There is no masonry at the bottom, then?—No.

417. Nor brickwork?—No; there is masonry, of course, underneath the foundations of the subway itself and concrete to that; it projects for some distance underneath, and then it is rammed in with the ground; and upon that is the gravel.

418. *Chairman.*] And in that gravel the pipes are laid?—Yes, in that gravel the pipes are laid.

419. Mr. *Cripps.*] You mentioned that that was actually done; assuming the system to be carried out, is that a system which you would yourself recommend, or should you recommend any modification of it?—I should recommend their being placed above the gravel.

420. Why was it you put them in the gravel in the first instance?—Because it was the wish of the gas and water companies; it was their mode of laying them, they preferred that mode, and we did it to meet their views.

421. They had always been in the habit of doing so?—Yes.

422. Since that has been done there, your attention having been called to it, what is the general result of your experience as to the benefits and advantages of such a plan?—I should state first, that we also laid gas pipes in the Southwark-street subway as soon as the street was completed; we laid, I think, a two-inch pipe for supplying the lamps along the line of street with gas, and that has continued in the subway from the time of its formation up to the present time.

423. *Chairman.*] How long is the street?—That street is 3,290 feet long, I think it is; and Garrick-street is 320 feet long; Southwark-street is ten times as long as Garrick-street.

424. Mr. *Duff.*] What is the length of Southwark-street?—3,290 feet, I think.

425. A little over half a mile?—Yes, a little over half a mile.

426. Mr. *Cripps.*] When did you say the gas and water pipes were laid down in Southwark-street?—The gas pipe was put down soon after the street was formed; I cannot state the year exactly, but four or five years ago.

427. Were those laid in the same way as in Garrick-street, or differently?—That pipe was laid just upon the surface.

428. Those also are pipes of the companies which actually supply the street with gas, I suppose?—Yes; in 1864, when this question was before Parliament, objections were raised; it was said that there would be a difficulty in getting room

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room to lay the pipes in the Southwark-street subway; that it would be difficult and dangerous to make the joints, and we ascertained, from evidence given before that Committee, that the engineer of the district thought it might be possible that they would require pipes of a certain size, both for the supply of the district, and for carrying through the district to supply any other districts beyond it, and we got pipes of the size which they thought might be necessary, and we put them into that subway; we made the joints in the ordinary way, and we charged the pipes with gas, and we found that it was done without any danger whatever; the gas engineers who were employed in doing that will describe more in detail what was done; but within the last few months we have put also two 18-inch gas pipes, two 9-inch gas pipes, and two 6-inch gas pipes; they have been charged with gas, and a number of experiments have been made upon them which will be described to the Committee.

429. You leave those details for the gas engineers?—I leave those for the gas engineers who conducted the experiments.

430. Having mentioned both those streets, now perhaps you will tell the Committee what generally is the result of your experience as to the advantages to be derived from the new system?—It has confirmed the view which I entertained in 1864, that gas pipes may be laid in subways with very great public advantage, and with greater security against leakage than they can in the present mode of putting them into the soil.

431. *Chairman.*] In the soil in streets, you mean?—Yes, in the streets. One great advantage that they possess is, that when once placed in the subway, they need never be disturbed. In the streets they are always liable to be disturbed, and it is exceedingly difficult to discover where they have been disturbed, or to remedy the evil until it has been going on for a long time. Whenever a trench is cut for sewers, or for water mains, the gas pipes have to be slung, and although that may be done without breaking the joints, or injuring them, it is not possible so to fill in the trench, and ram the ground, that it shall not for some months, or even years, afterwards be liable to sinking. When it sinks, a pressure is put upon the pipes, and they are frequently injured and broken. Now that is the great cause of danger in laying the pipes in the soil, which, I think, is obviated by placing them in the subway.

432. Mr. *Cripps.*] With regard to any danger which might arise from the escape of gas, has your experience given you any reason to think that there would be any danger from that source in subways?—I think that the danger really would be reduced to a minimum. I think, in the first place, that it is quite possible to make all the joints and connections in a new district, where a subway is formed, before the gas is put into the pipes, and that afterwards there is no necessity whatever to alter them, or to interfere with them. I think, if there were a necessity to interfere with them, that we have proved that it can be done with the ordinary precautions, and, I think, that if that were doubted, there is a means of forming joints in pipes charged with gas, which will be before this Committee, designed by Mr. Upward, which prevents the possibility of escape in any way.

433. *Chairman.*] You mean while the joint is making?—While the joint is making; that is an apparatus that was shown at a converzatione of the Institution of Civil Engineers a short time back, at the early part of this month; it is an apparatus that will be shown to the Committee, by which a hole can be drilled in a pipe, and another pipe screwed into it whilst the whole thing is hermetically sealed: there would be no possibility of escape; I think, as I said before, that is an extra precaution which it is not necessary to take, but which it is possible to take.

434. Mr. *Cripps.*] You refer to Mr. Upward, who will be a witness here. Now with reference to the question of expense in laying in the first instance, would there be any greater expense in laying them in a subway than is incurred in laying pipes now?—I think that the expense must necessarily be very much less in laying pipes in subways than in laying them in the streets: you get rid of the excavations and filling in altogether.

435. The expense of breaking up the streets, and relaying them to the satisfaction of the Commissioners, whoever the parties may be, falls upon the gas companies at present, of course, does not it?—It does; I would mention again, that in Southwark-street, almost immediately after we had formed the

street, the gas company in that district pulled up our paving to lay down gas pipes.

436. Was that the gas or the water companies?—Both, I believe; but I am now speaking of the gas company. I think that they were the first that did it; and I think the water company followed. I think the gas company then pulled it up a second time for the same purpose. Now, it is quite clear that when once a trench is cut in a perfectly formed street, where the concrete is cut out, and where the stone paving, which is formed just like an arch, is broken into, it is not possible afterwards to make it as compact and as perfect as when made as a whole. It is impossible to take up the stone paving and break through the concrete, and make a trench, and then fill it in, and make it as perfect as it was before. It was a very great injury to that street; it was one of the most perfect pieces of paving that could have been made, and it was very much damaged indeed in consequence of that operation.

437. You have spoken more particularly just now with reference to the gas companies, and the mode of laying their pipes; does the same apply to the water companies; could their pipes be laid at less expense in the subway?—The cases are precisely the same.

438. Is there any objection that you know of that could apply to the water companies' pipes being laid in the subways?—No.

439. No special objection occurs to you?—No.

440. Now, with regard to ventilation, which is another point, is there plenty of means of ventilation in these new subways as now constructed?—Plenty.

441. Will you just describe to the Committee in what way they are ventilated?—They are ventilated, as I described, by openings in Garrick-street of 80 feet apart, and in Southwark-street of 100 feet apart; then we have since added pipes coming in underneath the kerb of the footway, down to the side galleries, by which means air is let into the side galleries to pass up through ventilators at 100 feet apart; but supposing that did not afford sufficient ventilation, which I believe it does, there is no difficulty in multiplying the number of ventilating shafts.

442. Viscount *Galway.*] Where did the gas company lay those pipes to the injury of the street; in what portion of the street?—They cut through the pavement.

443. Whereabouts?—In this position in Southwark-street (*describing the same*).

444. Whereabouts; on the edge or the side of the street?—Upon the side of the street; they laid their pipes in the soil above our side galleries.

445. *Chairman.*] The noble lord wants to know where they cut the side trench?—By the kerb.

446. Where is the kerb; put your finger upon it?—This is the kerb (*pointing to the plan*).

447. How far did they cut?—They cut a trench about 4 or 5 feet in width; they took up the paving stones for a width of 4 or 5 feet, in a line all along the side of the street, and they then excavated the ground, and cut through the concrete, and laid their pipes in this space over the side galleries.

448. Viscount *Galway.*] What depth did they go?—Four or five feet in depth.

449. Mr. *Cripps.*] Below the concrete, of course?—Yes, through the concrete; below the concrete.

450. *Chairman.*] Was that on both sides of the street, or only on one side?—The gas company were on one side, and I forget whether the water company followed on the same side, or on the other side.

451. Was the street shut up on both sides by either the one or the other?—The traffic was very much interrupted indeed.

452. Mr. *Duff.*] On both sides?—I am not quite positive; I am not quite clear about that.

453. Mr. *Cripps.*] Have you had frequent opportunities of observing that where streets have been broken up it is a very great interruption to the traffic?—Yes, a very serious interruption, and a very great damage to the traffic in the street for a long time after it is done; it is the usual thing to allow, after a trench has been cut, for repaving three times over; that is to say, the paving you put down settles, ram the earth as tight as you can, and put down the paving as perfect as you can, it will settle again, and you have to do it on an average three times over before you can get it to stand.

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454. Mr. *Bagwell.*] At whose expense is that done?—At the expense of the company which is doing the work.

455. *Chairman.*] Do you do it and recover the expense, or do they do it?—They do it.

456. Mr. *Bagwell.*] Of course, in a macadamised road that would not apply?—It applies to that just the same, because the soil is excavated, and you cannot put it in as solid as it was before it was excavated. The consequence is, that it becomes depressed in the course of a little time, and forms a settlement, and you have to make it up again.

457. You said that in laying your pavements you formed an arch?—Yes.

458. Do you consider that a macadamised road forms an arch also?—Yes.

459. Viscount *Galway.*] The macadam ought to be laid in a slight arch?—It does not form an arch in itself the same as the paving stone; but the macadam would still sink into a trench itself just as the paving stones would, and you would have to place more stone upon it.

460. *Chairman.*] Is the macadam put in the same way as the paving stones, upon concrete?—Yes.

461. Then, in cutting a trench, in both cases they would cut through the concrete, in the macadam as well as in the other case?—Yes.

462. Mr. *Cripps.*] You were describing just now the mode of ventilation; as far as your experience has gone in these subways, where that system has been adopted, has it been sufficient, in your opinion?—It has.

463. Again with reference to light; how do you get light for the subway?—The ventilators throw a large amount of light into the subway, and we find that even with the ventilators at 100 feet apart, with reflectors we can get sufficient light to let the men work in it without any artificial light; at the same time we have used artificial light at the present time, gas.

464. But there is light enough, you think, even without artificial light?—Yes; it can be done without.

465. Do you attach some importance to the full opportunity that there would be in the subways, of inspecting the work while it was in progress, and laying the pipes so as to have full time to see that they were properly laid and joined?—I think that is very important; the gas or water pipes laid in the subway, can be got at readily and examined readily, and can from time to time be inspected in a way in which they cannot be when buried in the earth; that is one of the great advantages of a subway over the ordinary mode of laying pipes.

466. You mean not only in the original laying, but in inspecting them from time to time after they are laid; in both those ways it would be a great advantage?—A great advantage; it reduces, as I said before, the chances of accident to a minimum.

467. Is there any difficulty, in your opinion, in connecting those pipes so laid in the subways, with places where they are to join pipes which are not laid in the subways?—I do not quite understand the question.

468. The pipes, as laid in the subways, of course are at one level?—Yes.

469. And, as laid in the streets, they would be at a different level. Is there any difficulty, in your opinion, in connecting the two?—None whatever,

470. Will you explain how that is done?—That is done simply by a bend; by being bent down into the subway from the soil under the street.

471. And you find no difficulty about that?—None; we have experienced no difficulty from that.

472. Could that be done in the same way if it were necessary to have pipes going laterally again out of the subway?—I can see no difficulty in laying pipes in any way that may be required.

473. You had to go to Paris for the purpose of inspecting subways there, and making a report upon them, I believe?—I had.

474. Is that since the inquiry there, and since Monsieur Belgrand came over here?—Yes; I went in company with Mr. Bramwell, Mr. Hemans, and Mr. Boulvois.

475. *Chairman.*] When was that?—In the spring of this year.

476. Mr. *Cripps.*] I see that this report is signed by you and by Mr. Hemans, Mr. Bramwell, and Mr. Boulvois?—It is.

477. I will place it before the Committee by reading it to you, and then I will ask you some questions upon it. "Subways, London, 1st March 1867.—Dear Sir, Having received the instructions of your Board to inquire into the

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state of affairs in Paris in reference to the service of gas in mains laid through subways, galleries, or sewers, we have devoted some days to inquiries in that city, and have to submit to you the following report: The inquiry which had been made by some of us in 1864, and reported to you on April 16th of that year, gave us experience on which to organise our present investigations, and by a division amongst us of the interviews with the various officers of the municipality and the gas companies to avoid loss of time. We judged it proper to commence our researches by calling on M. Belgrand, the chief engineer of the municipality, and on stating our business, M. Belgrand, with a view as he said of correcting some errors which, probably from its being translated and written in shorthand, had crept into the evidence he gave before the Committee of the House of Commons in 1864 to us, in part of the proof which he had prepared for his evidence on that occasion, and desired that we should take it away with us and have it copied. A translation of this document is annexed. See Appendix A. Our conservation with M. Belgrand was directed to the solution of the following questions: 1st. Has anything new arisen in Paris since 1864 in regard to the practice of laying gas pipes in subways or sewers? 2nd. Has anything occurred since that date to add any new light to the experience then possessed on the subject? 3rd. Is your personal view unaltered and as much opposed to the laying of gas in subways as when you gave evidence against it in London in 1864? 4th. Has the gas pipe still been continued in the sewer or subway of Place Napoleon III.; and if so has it continued to be harmless? In reference to the first two of these questions M. Belgrand remarked, that a very serious explosion had occurred in the Pont d'Austerlitz in January 1865, by which one man had been killed on the spot and three others injured. M. Belgrand read to us his report made on the day of this accident, and as in the previous instance handed it to us that we might take a copy of it. A translation of this document is annexed.—*See* Appendix B. To the third question he replied, that in consequence of the above-mentioned accident he was more than ever opposed to the laying of gas pipes in subways; and he added, that since the gas pipes which were in subways or trenches over the bridges had been rammed round tight with sand. In answer to the fourth question he admitted that the gas pipe still remained in the small subway of the Place Napoleon III., and that no accident had occurred there. We were much impressed with the sincerity of M. Belgrand's conviction of the danger which would be incurred by laying gas pipes in subways, but as we had been previously far from satisfied with the necessity of coming to the same conclusion as he did, on account of the explosions which had occurred prior to 1864, and which he detailed in giving evidence in London in that year; so we now also determined to examine the subway of the bridge of Austerlitz very carefully for ourselves, and to obtain what further evidence we could as to the exact nature of the explosion in question, from which we might decide whether or not we were bound to agree with M. Belgrand in his deductions. We made this inquiry (as to minute details of the bridge of Austerlitz explosion) our chief and special business in Paris, and for this purpose, provided with proper lights and guides by the kind courtesy of M. Belgrand, we visited and measured carefully the subway itself. MM. Vaudrez and Savarin, Engineers of the Ponts et Chausees, kindly allowed us to inspect the designs of the bridge and gallery, which had been made before, and those made after the explosion, and we took a tracing of the parts we required. At the Central Gasworks MM. Le Pudry and Camoux both gave us all the information they possessed on the subject of the explosion, which had occurred under their jurisdiction while laying the gas pipes over the bridge at Austerlitz. This explosion had produced a very strong impression upon the minds of all these gentlemen, and there is no doubt that they were unanimous in their opinion that it furnished an invincible argument against any further attempts to lay gas pipes in subways. We, however, after a full and patient inquiry into and consideration of the subject, are of opinion, and think we can show that it is not probable the explosion in question had anything to do with the gallery or subway, and would have equally happened in a street trench under similar conditions. The evidence that we received varied in details, but in no way caused us to doubt the substantial accuracy of M. Belgrand's report, so far as the statement of facts is concerned, although we by no means agree with his deductions; we have, therefore, taken

M. Belgrand's report as the basis on which to consider the true nature and cause of the accident; it seems that for some years there had been a gas pipe and a water pipe, each half a metre in diameter in this subway, and lying nearly side by side; the water pipe is still there; the gas pipe was of cast iron, and had joints made according to a plan known as the system Despardeux; this it appears consisted in placing round about the joint of two pipes, put end to end, a belt of vulcanized india-rubber, secured outside by an iron band; it is needless to say that nothing could be worse for a gas joint than such an arrangement as this; and it appears from M. Belgrand's evidence before the Committee in 1864 (*see* question 4664,) that an explosion had taken place on the 5th of March in that year, but it will be found on examining M. Belgrand's proof, page 3, that this was one of the instances in which he was misreported, for there it will be seen that there was an escape only, and not an explosion; the escape was very strong, being nearly strong enough to suffocate a workman sent to remedy it. Looking at the ineffective character of the joints employed, a large escape was clearly always to be expected, and yet these pipes were suffered to remain in the subway until January 1865, at which time it was determined to remove them, and to replace them by a kind of pipe now very commonly employed for gas in Paris, but happily at present unused on this side the Channel. These pipes are made of that iron twined, or galvanized, bent round, and rivetted at the seam, and then covered outside with a coating of bitumen, and inside with pitch. The joint of one pipe with another, is made by inserting the end of one into the mouth of the other for a short distance, and by putting in a little hemp and grease; in order to lay these new pipes, which were of the same size as the old ones, viz.: half a metre in diameter, a valve was placed in the supply main close to the bridge, on the left bank of the river, and the first length of pipe was connected here to the supply main, and the succeeding lengths were laid one after another along the gallery to a length of about 165 metres, and at the time of the explosion, the whole of the pipe had been laid, with the exception of the last length or two required to complete the junction with the main on the right bank at the time of the explosion, which was about 9·30 a.m.; it appears there was a mason at work near the stop valve, and three other men were engaged in the gallery close to the open or further end of the new pipes already laid. From M. Belgrand's report, it will be seen that the stop valve closed badly, and that in anticipation of such a defect, two holes were made in the pipe (the newly laid one) in the immediate neighbourhood of the valve as a measure of precaution, and as a means of allowing the leakage through the valve to escape from the interior of the pipe to the exterior; it will be seen from the letter of Mr. Michael (Appendix E.), that he did not find any record of these holes on the drawings, nor in the debris of the pipe after the explosion, but it could be hardly expected that merely temporary holes would be indicated on a drawing for a bitumenized pipe, or that after it was blown to pieces, the portions containing these holes would be recognisable; there is, therefore, no reason to suppose that M. Belgrand's report is in error on this point; and if it be correct, we must say it appears to us that a more ill-advised proceeding, or one so likely to cause the mischief it was intended to obviate was never adopted, because the pipe having no pressure in it, the presence of these holes was sufficient to set up a current of air from one end of the pipe to the other, which mingled with the gas as it escaped from the valve, and thus formed an explosive mixture within the pipe itself; that such explosive mixture must have existed in the pipe, and was ignited there is clear from the fact that, in all the statements we have heard of the accident, the French words constantly used to us as regards the pipe, "le tuyau s'est développe," prove that it, or at least a great part of it, opened out of pressure from within itself, and was not broken up as it would have been had a general explosion taken place in the surrounding gallery; and that no such general explosion in the gallery took place is further shown by the fact, that the water pipe received no injury except in one part, an isolated injury, and no doubt caused by a fragment projected by the explosion. From the evidence we received, it appears that by far the greatest force of the explosion occurred at the end of the pipe next the stop-valve, and it was the mason who was working at this point who was killed on the spot. For many metres the pipe at this end was blown to pieces, while the remainder of the pipe was projected forward in the subway. This is all consistent with the state of things which would result from holes being made in the pipe near the valve, and from the

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the mixture having been ignited there by the mason; but assuming that such holes were not made, and that the explosive mixture was derived from the mere bulk of air in the pipe mingling with the escaping gas, and that its ignition took place from the open end where the three men were at work, it is still easy to understand how the greatest force of the explosion should be felt close to the valve, because the explosive mixture might, and probably would, be there stronger than in any other part of the pipe. It was distinctly stated that there was full ventilation in the subway at the time, expressly for light and air to the men. It is curious that at so short a distance of time we could not ascertain for certain whether the lateral openings, which now exist for ventilation, existed prior to the explosion. However this may be, we considered that the pipe of 19½ inches diameter could not have been opened out for a considerable length, except from the occurrence of the explosion within itself; that under the circumstances of a leaky valve, admitting gas at one end, and while the other was open to the atmosphere, there were just the most favourable conditions for an explosion, and we believe that such an explosion would have taken place without having any part of the pipes lying in a gallery or subway. Immediately after the explosion, the whole form of the gallery was altered, the water pipe alone left in, and the gas pipe was laid in a separated compartment of the subway, and surrounded by sand. Having learned all we could respecting the Austerlitz Bridge explosion, we visited the gallery in the Place Napoleon III. We found the gas and water pipes together there just as they had been three years before, and we ascertained that no accident whatever had occurred; these pipes having now been in about 12 years. When we referred to this in Paris, as an encouragement to lay gas in subways, the answer was, "Very true; but the gas is only safe there because it is never disturbed," the obvious reference to our minds is that gas would be equally safe in any subway, if carefully laid at first, and little disturbed, or very carefully disturbed afterwards, and properly inspected. The gallery of the Place Napoleon III. is partly a sewer, but seems never to have any water in the upper portion of it. We visited also the sewer below the Rue des Martyrs, in which it is stated a gas pipe was laid prior to the year 1831 or 1832, and was removed at that time in consequence of an explosion. We could obtain no evidence of the nature of the explosion, and there is nothing to show that it arose from the pipe, which was within the sewer, rather than from a leakage from a pipe external to the sewer, through the circumjacent earth. From a careful consideration of all that we have gathered in Paris, and even from the reports of M. Belgrand himself, we have come to the conclusion that most of the explosions have occurred from gas leaking into the sewers, where no gas pipes existed, but lay adjacent, and were badly jointed. For corroboration of this view, we would refer to M. Belgrand's proofs. It will be found that prior to May 1864, he only states as uncontradicted one explosion in subways, continuing gas pipes in that of the Rue des Martyrs, for although he asserts there have been explosions in the subway of the Place Napoleon III., he is compelled to admit the engineer, under whose charge these subways exist, stated that no explosion has ever taken place. The explosion stated in the Blue Book as having occurred at the Bridge of Austerlitz in March 1864, we now know from M. Belgrand's proofs to have been only a leakage; his proofs therefore show only one explosion in a subway containing gas pipes in that in the Rue des Martyrs, which occurred 35 years ago, and of which there are no particulars; while the same proofs give 15 instances of explosion in sewers in which there were no gas pipes; but where the gas must have penetrated from pipes leaky, and allowed to remain leaky, because they were buried in the surrounding earth, and were thus hidden from proper inspection. We consider that the explosion at the Austerlitz Bridge had, in all probability, nothing to do with the gallery in which the pipe was lying; and, finally, we see the perfect success and safety for a period of 12 years if the gas pipe laid along with the water pipe in the gallery under the whole circuit of the Place Napoleon III., which is now the centre of the Palace of the Louvre, in a very important position. We therefore venture to think, that the eminent Parisian engineers whom we have named have been too hasty in condemning the practice of laying gas pipes in properly constructed subways, and that, if carefully laid, well ventilated, and frequently inspected, the gas service might be safely so laid, and that great advantage to the public would ensue from such a practice. The greatest caution and care will always be necessary in dealing with gas, whether in or out of sub-

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ways; explosions will probably never be wholly avoided, but as they frequently occur now, where subways are not at all in question, we do not think their occurrence is likely to be increased by the introduction of pipes carefully laid and watched in large and well ventilated subways. On the contrary, we believe that explosions will be much less likely to occur, and that there will be savings to the companies from the diminution of leakage in the pipes. On the question of inspection we think it will call attention to the curious misconception under which M. Belgrand labours in respect to the management of our subways, as at pages 10 and 11 of his proofs he states, in effect, that if a gas pipe must be laid in a subway at all, it is much better that the subway should also be a sewer rather than a mere gallery for the purpose of containing pipes; because, he says, the sewer would be visited, while the gallery would not; and, he adds, that the gas pipes laid over the bridges in special galleries are never visited, except when unequivocal external signs make known strong escapes. We need hardly point out that the subways under the care of your Board, would be subject to all requisite supervision, and that we have this forcibly in our view when we state our conviction that the laying of gas pipes in subways will diminish rather than add to the danger to the public." That is signed by yourself, Mr. Hemans, Mr. Bramwell, and Mr. Boulvois?—Yes.

Mr. *Cripps.*] I mentioned, in reading that report, some matters stated in the Appendix. I think it would be better to hand them in without reading them through.

Mr. *Clerk.*] I object to your reading statements made by third parties, upon which I have no opportunity of cross-examining.

Mr. *Cripps.*] Then I will not read it.

478. To the *Witness.*] You have stated in that report that you yourself made certain examinations in Paris with reference to this matter; those were made by you?—Yes.

479. In fact the report is correct as I have read it?—Yes.

480. Is your opinion now founded upon the inspection you made there, and upon facts which you got from the French engineers?—Yes.

481. In 1864 we know that M. Belgrand came over here and gave evidence for the companies, against the subways then projected, stating as his objection those accidents which had occurred?—Yes.

482. Was it in consequence of that that you went over with Mr. Hemans and others to make a more complete investigation into what M. Belgrand had told us?—Yes; the summary of the report is this, that there were 15 cases of explosions in Paris, stated to have occurred in the sewers.

Mr. *Clerk.*] The objection I make is this: I do not object to Mr. Bazalgette stating the result of his own examinations made in Paris by himself and the other gentlemen, but I object to his stating here the report made to him by M. Belgrand and other engineers in Paris. If my learned friends want to have that, let those parties be called.

Mr. *Cripps.*] I have stated before, that I do not intend to put in that Appendix.

483. To the *Witness*]. The matters mentioned in that Appendix are matters which were handed to you, by M. Belgrand and the other engineers in Paris?—Yes.

Chairman.] The report is put in; you object to the Appendix.

Mr. *Clerk.*] I object to the Appendices being put in.

Mr. *Cripps.*] Mr. Bazalgette goes over to Paris, and he sees the engineers, and by their courtesy he inspects the places where those accidents are said to have occurred, and in that report which I have read to you, he gives his opinion as to the cause of those accidents.

Chairman.] Without referring to the paper which the learned gentleman objects to, and which appears to me to be a perfectly reasonable objection, it being the evidence of somebody else who is not here to be personally examined, Mr. Bazalgette can tell you what he ascertained for himself.

Viscount *Galway.*] We have Monsieur Belgrand's former evidence in 1864.

Mr. *Clerk.*] Certainly; then the promoters of the scheme have sent over some gentlemen who have had a long interview with Monsieur Belgrand, in consequence of which they have made a certain report; what course they are going to take I do not know.

Mr. *Cornwall Legh.*] The learned counsel can examine the witness upon what he saw.

Chairman.] Ask Mr. Bazalgette what he knows from his own observation. Ask him the usual questions as to what examination he did make.

484. Mr. *Cripps* (to the *Witness*).] I think you told us that you made the examinations as you have stated them in the report?—Yes.

485. *Chairman.*] You stated that there were 15 cases of explosion?—I have stated that there were 15 cases of reported explosion, but in none of those cases were the gas pipes in the sewers or subways where the explosions took place.

Mr. *Clerk.*] This is what he was told by Monsieur Belgrand.

Mr. *Cripps.*] All that I have asked Mr. Bazalgette is, what he saw himself in Paris; I do not propose to go any further upon that.

486. To the *Witness.*] I do not think I asked you anything with reference to the cost of the construction of the subways?—The subway in Garrick-street cost 2 *l.* 15 *s.* a foot linear, and in Southwark-street, I think 3 *l.* a foot; that was built in cement, with faced bricks upon it; I think it was a little over 3 *l.*

487. *Chairman.*] Is the subway in the Thames Embankment dearer or cheaper?—I cannot tell you that; I have not got out the estimate of that, separately from the rest of the embankment.

Cross-examined by Mr. *Clerk.*

488. You have told the Committee the length of the Garrick-street subway, and the Southwark-street subway?—Yes.

489. Those are both comprised in the Act of 1867, and mentioned in the schedule to the present Bill?—Yes.

490. Will you tell me, if you please, what is the length of these different streets; I will take them in the order in which they are mentioned in the Bill; I have here the Victoria Park Approach Act of 1858; what is the length of the new street and subway proposed to be made under that Act?—I have not the materials with me now to enable me to follow that through, but I can give them to you on another occasion.

491. If you please, because it is most important, seeing that the object of this Bill is to make it compulsory upon the companies to use them?—I will furnish them to you.

492. Can you tell me what the length of the Thames Embankment subway is?—I will give you the list altogether, specifying the lengths.

493. The particulars of all those which are mentioned in the schedule to the Bill?—I will.

494. The length and the capacity of those several subways?—The capacity I could not give you, because they are not designed yet.

495. They are not designed?—No; they will have to be designed according to the requirements of the streets that are carried out.

Chairman.] He can give you those which are constructed.

496. Mr. *Clerk.*] The object of the Bill which you have introduced is to compel all water and gas companies to go into these specific subways; surely we must know, if we are to be compelled to go, what is the accommodation to be provided for the different water and gas companies?—I can give you the length; I think it would be difficult to give the exact dimensions of those subways, because they will be designed according to the requirements, when we know what the requirements of the peculiar localities are.

497. As we shall have to go into that, will you give me the lengths, and the particular localities where those are to be placed?—I will.

498. I take it that the whole of your experience to the present time arises from what has taken place in Garrick-street, and what you have done yourself in South wark-street?—Yes.

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499. And your own experience in London?—Yes; coupled with what I saw in Paris.

500. And the opinions which you there heard from all the French engineers against it. Now will you tell me what is the number of communications; we will take first from the gas pipes: there are two gas pipes, as I understand, in Garrick-street?—There are.

501. What is the number of service pipes in Garrick-street from the main pipes to the different houses?—I could not tell you the number of houses; there would be a service pipe to each house.

502. How long is the street?—300 feet long.

503. What is the number of houses; there are not houses along the whole length of that subway: part of the subway is in the wide roadway before the street commences, is it not, St. Martin's-lane?—It commences with the street.

504. Can you tell me what number of houses there are on either side of the street?—I do not know that.

505. Will you be so good as to give us that, that we may know the number of communications?—I will.

506. Are those mains leading to any other locality beyond the supply of that street?—No.

507. With regard to the water, is it equally true that the water main there supplies only the houses in that street?—It is.

508. Neither of them is a leading main to any other place?—No.

509. Therefore, there are no lateral communications to any other street from those mains?—No.

510. Was it the fact that prior to 1864 there was a leakage in the Garrick-street subway?—I do not recollect it.

511. Do not you recollect that Mr. Marrable, who had been the architect, I think, to the Board of Works, mentioned to the Committee that he had found a leakage of gas there?—I do not remember that; but Mr. Marrable will be examined.

512. In the Southwark-street subway, you yourselves placed the pipes for the purpose of lighting the lamps, I think?—We did.

513. There are no communications at all, I believe, from these pipes to any house?—No.

514. The only communications are from the 2-inch main, which feeds the gaslights on either side of the streets?—Yes.

515. And there is one 2-inch gas main on one side, and one on the other; that is so, is it not, in Southwark-street?—No; I think only one.

516. Mr. *Duff.*] Is this a correct plan (*showing the same to the Witness*); that shows two, one on either side?—It does not show the small pipes to which I allude to, to light the gas lamps. This shows the pipes which have been put in as experimental mains.

517. Mr. *Clerk.*] I think you mentioned that in 1864 you put down two pipes?—I am not certain about it.

518. Of course there are no cross pipes from those little mains in the street?—There are branches to each gas pipe.

519. Those were put in by yourself, and not by any gas company?—They were.

520. There is no water pipe, I think, in Southwark-street?—No.

521. And in no other subway in London has there yet been put in any gas pipe or water pipe?—No.

522. Do you know yourself what the cost of putting in the pipes in Garrick-street was to the water company, and the gas company?—Putting them in the subway?

523. Putting them in the subway?—I do not.

524. You do not know whether it cost them more than it would have cost them to lay them in the soil of the street?—I do not know what it cost them.

525. You never head that?—No.

526. You did not hear the evidence given in 1864?—I dare say I did.

527. Then you do not remember it?—I do not.

528. In Garrick-street the pipes, I understand, are laid in the gravel, on the top of the concrete?—Yes.

529. Even supposing the pipes were laid as suggested in the diagram, raised

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above the floor, there still would be a certain depth of gravel, would there not, above the concrete ?—It might or might not.

530. But you would have the concrete protected in some way, would you not? —The concrete does not require protection at all.

531. What is it that the pipes rest upon?—They rest upon the gravel.

532. But here what do they rest upon; they are raised I see ?—They rest upon brick or wooden chairs.

533. Which you propose to place upon the concrete ?—Upon the gravel, just upon the surface.

534. Though you have had no experience as yet, except the little things which you have got in Garrick-street and Southwark-street, I suppose you can contemplate a subway being constructed in a great leading thoroughfare ?—Yes.

535. Where there might require to be, if you had the power of compelling the companies to go in, 36-inch mains for water pipes, and 30-inch mains for gas pipes ?—Yes.

536. Have you any diagram showing how you would accommodate the mains, such as exist now in many of the great leading thoroughfares of London ?—No ; I have no such diagram.

537. All that we know of what you have done are those little things in Southwark-street, and this little affair in Garrick-street; now you have mentioned that you might have to deal with Holborn and the Strand, do you know what number of water mains there are in Holborn ?—They are very variable in different parts of Holborn.

538. You see it would be very important to know how you propose to deal with those, how you would place them ?—If you will give me any specific case of any number of pipes that exist in those streets, I will undertake to produce a diagram showing how they would be accommodated.

539. Will you show me a diagram accommodating four 36-inch water mains, and four 30-inch gas mains ?—If you will be kind enough to tell me where those exist.

540. They exist in many parts of London ?—If you will give me any specific point, because the width of the street has a considerable influence upon the matter.

541. Take the lower part of the Strand, will you show me, if you please, how you would accommodate these mains there, because you know I dare say, that the communications are not made with the great mains to the houses from the water pipes ; the communications to the houses are not made from the mains, there must be service mains or district mains, in addition to the great leading water mains ?—Yes.

542. Have you in preparing this scheme ascertained what number of mains exist in many of the great thoroughfares in this city ?—I have a general knowledge of what exists.

543. Let me ask you in Regent-street, what number of mains are there ?—I cannot undertake to say that off-hand.

544. What number of mains do you contemplate you would have in the Thames Embankment ?—It is impossible to say ; we had a proposal from one of the companies to lay large gas pipes through that subway, which we shall be prepared to entertain.

545. We should like to entertain the idea now. It would be necessary, would it not, if there were water and gas mains laid along the Thames Embankment to have the means of making communications northwards with the lateral streets going at right angles towards the Strand ?—Yes.

546. Will you be so good as to tell me whether this sheet of a very useful publication called the "Illustrated London News," represents at all correctly the position of the subway relatively to the railway and roadway ?—As far as the picture is concerned it is a picture of it.

547. It agrees pretty nearly with the section, does not it ?—I do not know whether it does or not.

548. Here is the river wall, is it not,—here ?—Yes.

549. And here is the sewer nearest to the river wall ? —Yes.

550. And here is the subway above that ?—Yes.

551. And then you have 100 feet of roadway over that extending inland ?—Yes.

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552. Then there is the Underground Railway beyond?—Yes.

Chairman.] The Underground Railway and the roadway may be the same thing unfortunately; in front of Somerset House they are coincident.

553. Mr. *Clerk.*] In some places they are coincident, and in some places the railway would be nearer to the shore; that picture which conveys more to an unprofessional mind than the section, represents pretty accurately that state of things, does not it?—It represents it sufficiently accurately for a picture; it represents the Waterloo and Whitehall Railway, and represents the embankment of the Thames, and it represents the Metropolitan District Railway, and the Charing Cross.

554. Will you be so good as to explain how, if you were wanting to go up any one of the streets running down at right angles there from that embankment, any junction would be made with those pipes; you can show it here upon your plan; here is your plan; here we have the different mains and pipes placed in the subway, and here we have the road here; and here is the Underground Railway?—No; on the other side. I can see no difficulty in doing that whatever. I do not know what the difficulty is.

555. How would you carry them?—I should carry the gas or the water pipes direct from the pipes in the subway underground over the railway up to this street.

556. Underground, over the railway?—Yes.

557. What is the depth between the roadway and the railway?—That is very variable; but the railway is to be covered by girders, and even if it came close to the surface there is no difficulty in laying the pipes between the girders.

558. There has been no arrangement made with the railway upon that point, has there?—No.

559. You would require opening the streets for that purpose?—No, it would not require opening the streets.

560. Can you tell me what is the average depth, supposing that is the underground railway, between the roadway and the girders?—It would vary very much.

561. Between what limits?—I suppose that in no case it is nearer the surface than 3 feet, and from that to 7 or 8 feet.

562. Do you know how much of it would be above 3 feet?—I dare say a great deal of it.

563. Would it be convenient to lay in a 36-inch or 3-feet main there?—There would be no difficulty, with any little modification of the design; it is a thing we are doing constantly.

564. This is all new; this thing has not been done yet?—The laying of a branch line of water pipes and gas mains is certainly not new.

565. As I understand, in Southwark-street and Garrick-street there are those side passages at every other house?—There are.

566. Now in that street there is no communication at all with the open air, except in the subway; there is no passage such as you have suggested somewhere else in some drawing?—There are just the openings as shown in this drawing.

567. There is an opening into the cellar?—There is no opening into the cellar.

568. There must be an opening into the cellar for the purpose of the passing pipes through?—There is an opening at every 100 feet in the crown of the subway into the street; I have stated that we have also put in openings by the side of the kerb, to carry them down to the side passages.

569. When was that done?—That was done about 1864.

570. Those were not there in 1864 when you were here?—No.

571. What is the size of that opening?—I think it is a 9-inch pipe.

572. Where is that carried up?—It is carried up underneath the kerb to the grating in front of the kerb.

573. Is the grating flush with the pavement?—The grating is vertical; you do not see it in walking on the pavement: it is in the gutter; it is tilted up.

574. What is the size of the grating?—I suppose about a foot by six inches.

575. That is the size you put in?—I cannot be accurate, it is somewhere thereabouts; perhaps 18 inches.

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576. What is the size of the ventilating holes in the grating in the streets?—They are about 18 inches to 2 feet in diameter.

577. Now, supposing that there were large mains for water and gas laid down there, I understand you are of opinion that these holes in the surface are sufficient for introducing ventilation, and for carrying off any gas that might collect there?—They are; I have formed that opinion from practical knowledge, because when we were laying the gas in these pipes, there was a considerable escape of gas, and we found that it was carried off perfectly. We had lights in the subway, and took no particular precaution about it; in fact, we had no occasion to do so.

578. Were the gratings down at the top of the holes at that time?—They were.

579. In what street was that?—In Southwark-street.

580. With a 2-inch pipe, I believe?—I am speaking of the experiments with an 18-inch pipe.

581. Does that 18-inch pipe supply any of the houses?—No; it does not.

582. Then you have never had experience yet of putting in any communication pipes to the houses?—We put in all the junction pipes, and all the joints and all that sort of thing, with the gas laid on in Southwark-street.

583. To what?—Put them into the branch galleries.

584. I understood you that no houses were supplied?—They are not connected with the houses, but they were put in as experiments, to see if we could make the junctions when the gas was laid on, and we have performed the operation just the same as if there were houses.

585. Was the main charged with gas?—Yes; and was charged with a very much greater pressure than it would be charged with under ordinary circumstances.

586. Is that main charged with gas now?—It is.

587. At the present time?—Yes.

588. What was the size of those pipes you put in there?—Two 18-inch, two 10-inch, and two 6-inch pipes.

589. And they are there now?—They are.

590. How did you place them?—In the manner shown in this sketch (*exhibiting the same*).

591. It is shown in the section there as a 6-inch and a 9-inch, and an 18-inch on either side?—Yes.

592. Those are put down there as you would arrange them for the supply of the houses; those supply the houses on one side and these supply the houses on the other side; is that what you propose?—No; those would not be required for the supply of the houses.

593. Would you have gas pipes on either side of the street to supply the houses?—Those are more than are required.

594. But you might also require that main through the street to get to the district beyond?—We should not require two 18-inch mains, two 10-inch mains, and two 6-inch mains; those were put there for experiment.

595. That would depend upon the district beyond to be supplied with gas?—Yes.

596. Supposing that was the state of things there, where would you put the water pipe?—As I have said before, we should not require four mains of gas; we should not in Southwark-street.

597. Perhaps you might not in Southwark-street, but, supposing the thoroughfare was such as that it would require that amount of pipeage for the purpose of supplying the district beyond, where would you put the water pipes?—If you will give me any case, with the number of pipes you would require, I shall know how to arrange them.

598. I put a suppositious case; you are going to compel the companies to come in at any place?—If you wanted that number of gas pipes and water pipes besides, I should arrange them differently.

Chairman.] I do not understand that the Bill seeks to compel the parties to take their pipes into any place the Board may choose, but they are to take them to the places scheduled; therefore it is quite competent to inquire into

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into those, but not to inquire into streets or places which are not scheduled.

Mr. *Clerk.*] But this is also to be the basis of a General Act.

Chairman.] It may be so, but it is not specific. It takes no power beyond the schedule.

Mr. *Clerk.*] It applies specifically to those places.

Chairman.] You can inquire upon those, but I do not think you are entitled to take a range all over London.

Mr. *Clerk.*] It says to any place that may be authorised hereafter.

Mr. *Rodwell.*] You will have an opportunity of inquiring into that at the time, when any further proposal is made. My learned friend is rather drifting into the difficulty which was created in the last Bill. I tried in opening the case to steer clear of that. I only dealt with the subways which are mentioned here. If we do apply to make subways under any particular streets not mentioned there, the gas and water companies will have an opportunity of inquiring into that. All the gas companies will be heard to suggest any particular arrangement, but that does not arise under this *Bill.*

599. Mr. *Clerk* (to the *Witness*).] I must ascertain from you, if I can, in the case of any street requiring so many pipes as this to be carried down through it, where you would place the water pipes?—My answer to that is this: if you will give me any definite case, and will state any one of those streets, and what pipes you will require, I will undertake to show you how they can be placed in a subway; but to put me an indefinite number of pipes of an indefinite size, it is impossible for me to give you any definite answer. I am really quite prepared to give you a very definite reply, and to show you by drawings distinctly how I would provide accommodation for any number of pipes that you will tell me is necessary for any particular street.

600. I do not say for any particular street; I cannot tell what may be required hereafter in the Thames Embankment, or in any of the streets mentioned here; but I put it to you as an engineer, there being as many as are shown in that diagram, how you would place them?—Supposing there were even that number of gas pipes, arranging them on one side differently to what they are arranged here, there is plenty of room for other pipes upon the other side.

601. Viscount *Galway.*] In these subways that you have made, have you taken into consideration the requirements that there are likely to be, and how many pipes can be placed?—I have, and I have gone further. We ascertained in 1864 from the engineers of the gas and water companies what sized pipes they might ultimately require for the district beyond, the largest sized pipes likely to be required, and immediately when we got their evidence, we put in exactly those sized pipes in this subway, and showed that we had plenty of room for them, so far as the subway is concerned. I forget what they required.

602. Mr. *Clerk.*] What subway is that?—This is the subway in Southwark-street. I think the water engineer said that he might require two 10-inch mains, or the gas engineer two 10-inch mains, for going through the district, and the water engineer an 18-inch main, and a 10-inch main, something of that sort; that was what they thought would be required for the district.

603. Viscount *Galway.*] The Southwark subway is the greatest length, is not it?—Yes.

604. Mr. *Clerk.*] Who was that engineer?—The Lambeth engineer, I think.

605. Was he examined in 1864?—He was; I will not say who was the engineer, but all I say is, that the engineer of the gas and water companies in that district did give us, and we were most anxious to ascertain what they would require for Southwark-street, and the moment they told us the exact pipes, we put them in; we would do the same for any other street: we would undertake to give abundance of room, and leave a margin afterwards for others.

606. We must know how that is to be done, and whether the scheme is practicable?—

ticable?—If you will give me a definite case I will show you how it is practicable.

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607. Do you propose, where you have the large mains, to have the water mains on one side and the gas mains on the other side of the subway?—That is a matter of arrangement, whichever is the most convenient.

608. You are here asking for a scheme to be sanctioned by Parliament; have you ascertained that?—I do not think it is possible to lay down a rule as to whether you would have the gas pipes on one side and the water pipes on the other; that must be arranged according to the circumstances,

609. You are asking that these companies should be compelled to go into these particular subways that you have authority to make; have you not at all determined whether, in any of these particular cases, the mains are to be on one side or both sides of your subway?—I tell you there is no definite rule that can be laid down.

610. Then sometimes the water will be upon one side, and the gas will be upon the other side?—Yes; and sometimes both on the same side.

611. I will just take this case; suppose the water pipes to be on one side and the gas pipes on the other side, and both sides of the street to be built upon, you will have there double interlacing services, will you not?—They will have to cross each other if there are single pipes.

612. Supposing that the water mains are on the right hand side of the street, the service pipes will come away here to the left to those houses, and the gas pipes will go across to the right?—Yes.

613. Supposing that, even with the greatest possible care, a water pipe bursts in the subway, that is possible, is not it?—Yes.

614. Water pipes burst, do not they, from variations of temperature; are you aware of that?—Yes.

615. Now we will suppose the main to burst in the subway, and that state of things to exist of these interlacing services from side to side, how would you bring in a new 36-inch main to replace that length of broken main?—I would bring it in at the side entrance.

616. Supposing it to take place about the middle of the subway?—Then I should take it down the centre between the pipes.

617. Carry it over the service?—Yes.

618. What is the weight of a 36-inch main, 12 feet long, that is about the length, is not it?—Yes, I think it is.

619. What is the weight of that?—I cannot tell you offhand; there is no difficulty in having a tramway formed with trucks, to lay it across those services without injury.

620. A permanent tramway over the services, is that part of the scheme?—No; it is not part of the scheme, but it is a convenient mode of carrying pipes in.

621. Is that included in the 3 *l.* per running foot?—No, it is not; the cost of a contractor's tramway would be very small.

622. As coming to the comparative cost of reparation it would form a material item, that tramway, would not it?—No; I think not.

623. You do not know what it would cost?—No; but it must be very small; a couple of contractor's rails would do it.

624. What do you mean by bringing the main into the side entrance, a 36-inch main 12 feet in length, supposing that occurred in Southwark-street?—We have got all those pipes in, in Southwark-street.

625. How would you bring a 36-inch main into the subway in Southwark-street?—We have got them in, in Southwark-street.

626. But the street is not built upon yet, is it?—No.

627. Where do you get it in?—At the side entrance.

628. Where?—At the side of the subway.

629. Do you mean at one end of the subway?—Yes; at the side of the subway.

630. Will you explain how you get down to the subway to get in the pipe?—We get down by vertical shafts with horizontal gear.

631. What is the width of that shaft?—Various widths.

632. What is the width of the Southwark-street shaft?—I cannot tell you what the width of that is.

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633. Is it four feet in diameter in the circle?—No, it is oblong. It is longer than it is wide; and passes into the subway.

634. What size; four feet wide by what; can you give us the dimensions of it?—No; I cannot tell you the dimensions, because you enter into an oblong entrance, and then it opens at the top into the gallery.

635. Have you a drawing of that?—No, I have not.

636. Supposing you had a main of that kind to let down, a 36-inch main, 12 feet in length, which is the ordinary length of those mains, how would you let it in?—There would be no difficulty; we have done it at the side entrance in Southwark-street, and in various other places we have done it.

637. Will you tell us how you do it?—In Southwark-street we did it at the side entrance.

638. When the street is built up how would it be?—There are two side entrances, one at each end of the subway.

639. At the side of the street?—Yes.

640. How are those covered over?—By a plate.

641. What is the size of that?—I suppose it must be three or four feet in diameter.

642. Then you would have to let down this column vertically in the subway?—Probably the most convenient way would be to take it in at the crown of the subway, opening the subway.

643. What length of time would it take to open the subway and let the main in it?—Two minutes to open the subway.

644. And to rebuild it?—It does not require that; it would be like the ordinary openings to our side entrances, simply an iron grating lifted up with a key.

645. One of those ventilating holes do you mean?—Yes.

646. And you would let it down vertically there?—Yes.

647. On the top of the other pipes?—One of the ventilating holes.

648. You would let it down vertically?—Yes; or let it down an incline on to the truck. I do not see any difficulty about such a simple thing as that.

649. This is a place full of water and gas pipes, and gas communications going on on either side?—Yes; there is not the least difficulty about that, as I can see.

650. Remember that these are not things that have been done?—They are the most ordinary operations in the world.

651. Practical engineers do not think so?—You see in cellars in the Strand large casks going in and out without the slightest difficulty.

652. Supposing, which you admit to be quite a possible thing, that one of these great water mains was to burst in the subway, as they do now not unfrequently in the ground, what would become of the water?—I suppose, in the first instance, the water would flow into the sewer.

653. Do not you think that the gravel in the subway would soon choke those gratings?—I think it would; that occurred to me; and, therefore, I think it would be better to have the gratings just at the side of the brickwork, not at the bottom, or as we are now doing in the Southwark-street subway, to have at the bottom, instead of gravel, a thin coating of concrete, so as to have no gravel to wash down.

654. There being these openings, or gratings, at the crown of the arch, do not you think a great deal of mud would wash in from the roadway, in a macadamized street especially?—No; we have had a great deal of experience in that; we have found, in two years, in the Garrick-street subway a small heap of mud collected under each grating, but it was removed in about an hour.

655. Supposing there was a flush of water from a broken pipe, the effect of that would be to carry all that mud into those gratings, would it not?—Not if they were placed, as I suggested, at the side.

656. Why not?—Because it would flow into the gratings.

657. The gratings are perfectly open, are they not?—Yes.

658. That would be a nice ventilation from the sewer into the subway?—It could be trapped like any other grating.

659. And from the subway into the houses?—Not into the houses, there is no connection.

660. Are not there apertures from the subway into every house?—No.

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661. How would you carry your pipes through into the houses?—It would be closed all round.

662. You would have a hole in the brickwork to carry your pipes through?—We should put the pipes through, and close the brickwork up.

663. Do you know what the causes of the leakage of gas pipes are?—I think I have stated that one of the principal causes is the settlement of the ground.

664. Where do the gas pipes leak?—I imagine principally at the joints.

665. Do you say only at their joints?—No; I will not say only at their joints, but principally at their joints.

666. Do you know that gas pipes leak also not unfrequently, from the porous nature of the pipes themselves?—I think defective pipes may do so, but not to a large extent.

667. You had, in 1864, a scheme of a diving bell, for the purpose of making communications?—Yes.

668. Is that part of your scheme now?—No; I have not thought of it since; the idea suggested itself to me as one that might get over the difficulties that had been raised; I think 20 other plans may be suggested, but I think Mr. Upward's plan is the better one.

669. What was the length of the experimental main that you put in Southwark-street?—I think about 40 or 50 feet; however, that will be given to you in greater detail by those who conducted the experiments.

670. You went over to Paris, you say, in the Spring of this year with those other gentlemen?—Yes.

671. You saw Monsieur Belgrand?—Yes.

672. I understand you to say that you stated your business?—Yes.

673. Do you mean to say that you informed M. Belgrand that you came there with those other gentlemen on the part of the promoters of this scheme?—We told M. Belgrand that we proposed to come to Parliament again this year for power to lay gas pipes in subways, and that we were very anxious to inform ourselves upon what had been done in Paris, and to get all the information we could upon the subject.

674. Did you give M. Belgrand your name?—I did.

675. There is a very great misapprehension upon the part of M. Belgrand upon this point?—Allow me to say, if there was a misapprehension that M. Belgrand wrote me a letter, after our first interview, expressing regret that he did not know that it was me at our interview, and he afterwards called on me at my hotel and informed me that he had not caught my name, or something of that sort; he expressed regret that he had not been able to show me some personal attentions.

676. You wish to impress the Committee with the idea that there was some misapprehension with regard to what took place at the Pont d'Austerlitz prior to 1864, in the evidence of M. Belgrand in that year, that he spoke of an explosion, and called it an explosion when it was only an escape of gas?—Yes.

677. Have you looked at the evidence again to see what it was that M. Belgrand did say?—It is quoted in the evidence as an explosion.

678. The word "explosion" is used, but it is explained immediately afterwards at 4664. "The most serious explosion took place on the 5th of March last in the subway of the bridge of Austerlitz; that was a very important escape that took place in a pipe measuring about half metre that was placed in that subway. They wished to repair the leak on the 5th of March, and they sent down a workman, but he was suffocated; at least they got him to his senses, he was not thoroughly suffocated. They could not repair the leak, except by stopping the pipes at each side, outside the subway, at the two extremities." That explains that what was first called an explosion was a mere leakage; that was the mistake which you refer to in his evidence in 1864?—Yes, which he corrected himself.

679. Do I understand you to say that there had been no ventilating shafts at the Pont d'Austerlitz in 1864?—I do not say that.

680. I understood you to say that in your report which you have brought to day?—No; we do not say so.

681. In the report which you gave in, you say, "It was distinctly stated that there was full ventilation in the subway at the time, expressly for light and air to the men. It is curious that at so short a distance of time, we could not ascertain for certain whether the lateral openings which now exist for ventilation, existed

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existed prior to the explosion." But there was a complete system of ventilation prior to that, was there not?—That we could not ascertain; there was a conflict of opinion at the time.

682. There were several ventilating shafts about that time; at least, so M. Belgrand says in 4665?—All I can tell you is that we found with surprise that in so short a distance of time we could not get definite evidence upon that; there was a difference of opinion.

683. In 4665, M. Belgrand says there were several ventilating shafts in the Bridge of Austerlitz?—Yes, that was contradicted by some others.

684. That was what M. Belgrand said in 1864; that you do not accept as a fact?—We think it quite immaterial whether there was or not.

685. In the Place Napoleon, there is a gas pipe which has been there for 12 years, we understand?—Yes.

686. Will you tell us first in what part of Paris that is?—At the Palais Royal.

687. Where does it go to, and where from, and what is the length of it?—I do not remember exactly; but probably about a quarter of a mile.

688. Is not the Place Napoleon near the Louvre?—Yes.

689. Do you know what is supplied by this pipe in the Place Napoleon?—The gas lamps in the street.

690. Did you go down into the subway?—Yes, and I was very much struck with what I saw; for, when I went down into it, we stumbled over some workmen's clothes there, and upon inquiry we found that the workmen were actually in the habit of going and sleeping in that subway, and smoking their pipes, and they seemed to have no fear of an escape of gas, and there was none.

691. What is the size of the pipe at the Place Napoleon?—I am afraid of speaking of dimensions, because one sees so many of these things that I may be inaccurate, but I should think about 8 or 10 inches; with a great number of very badly formed junctions, bent round and sticking out in all directions in the subway.

692. Is that the only subway in which there is a gas pipe laid down?—I believe the only one.

693. Then the others have been removed in the Rue des Martyrs; they have been taken away?—There have been none for 35 years.

694. Have those in the Pont d'Austerlitz been removed?—Yes.

695. There are other subways in Paris?—Yes.

696. Have they in the Boulevard de Sebastopol, been removed?—Yes.

697. There is no gas pipe in any of those?—No.

698. *Chairman.*] They are not subways, they are sewers?—In the Boulevard it is a subway; in the other parts they are sewers made with side galleries, to enable the people to get along.

699. Mr. *Clerk.*] That is to say, the subways of Paris are open to the sewer, there is a kind of roadway on either side?—Yes; it is shown there.

700. The sewer is not arched over as it is in your case?—There are side galleries formed down it, and they generally place a rail here, and another there, so that persons can go through.

701. *Chairman.*] The sewer and the subway are combined?—Yes.

702. Mr. *Clerk.*] It would be the same as if you were to cut away the top of your sewer and let it into the subway?—Yes; it would be very much the same thing if you cut away the upper portion of the sewer, and left this with side galleries.

703. Now tell me, if you please, supposing this Bill were passed, and the different water and gas companies were compelled to go into the subways, at whose cost do you think that should be done——

Mr. *Cripps.*] That is provided for in the Bill itself.

Mr. *Clerk.*] No it is not, not as we think it should be; I will take the case where there is an existing street, any street where the pipes are already laid.

To the *Witness.*] You stated in 1864 that you thought the companies ought not to be at the expense of doing that themselves, changing from one to the other?—At present we propose the construction of subways only in new streets, so that that would not arise.

704. I see

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704. I see in 1864 this was asked you, I think, by the Honourable Baronet in the Chair, at that time Sir Baldwin Leighton:—"There is another question that affects the companies, whether the expense of the subway, or the rent they pay to the Board for the subway, would be less than the expense they are put to at present in repairing?—That is a point that might be fixed upon; the maximum amount might be fixed upon by the Act." Then you were asked by the Honourable Chairman—"You have no idea at all upon that subject yourself, have you?—My own idea was to make a small payment to cover superintendence: my idea never was that they should pay for the whole cost of the subway." Then the Chairman says—"Or the interest of it?—Or the interest of it." You say, "I think if the companies pay for the maintenance, the public will have constructed the subway, and will derive a great benefit from that subway; and therefore the expense would fall upon each, to some extent; the exact amount I am not prepared to fix; I have not fixed it in my own mind. Your opinion is, that the Board of Works ought to pay for the subways, and then that the companies ought to pay for the maintenance and the supervision of your works and the pipes?—That is my idea." Is that still your idea?—Yes.

705. In your opinion, the public will derive a very great advantage, will they not, from the construction of your subways?—If the gas and water pipes are placed in them.

706. I see that it was proposed by our lamented friend, who was then your counsel in 1864, that the arbitrator, in considering what amount should be paid, should take into consideration the benefit the public derived; do you remember that?—No, I do not.

707. You will find it in the evidence on the 26th May 1864, at page 173; "Mr. Phinn stated that in consequence of what had passed during these proceedings, his clients had reconsidered the whole structure of the Bill, and they proposed to confine the compulsory powers to subways already made, or authorised to be made; to impose an obligation on the Metropolitan Board of Works to enlarge any subway if needful; to insert in the Arbitration Clause principles for the arbitrator's guidance, in assessing the compensation payable by the Board, namely, that there should be taken into consideration on the one side the advantages to the public from the subway, and, on the other side, the pecuniary benefit derived from the construction and use of the subways by the companies." Then in 1864 it was proposed, I see, that the advantage to the public should be one of the items to be taken into consideration in determining the price to be paid?—Yes.

708. On the other, so far as the companies were concerned, the pecuniary benefit which they themselves would derive from being carried into the subway; that I understand you is what you think should be the whole amount which the companies should be called upon to contribute for the benefit which they derive, and the same as to the benefit which the public derive?—I think that would be better left to the arbitrator.

Re-examined by Mr. *Cripps*.

709. One word upon the Bill itself; we know that the Bill, as it is at present before the Committee, is intended only to have application to certain streets named in the schedule?—Yes.

710. And if at any future time the Board of Works thinks it right to construct any further subway, that is a question which must come before Parliament, must it not?—Yes.

711. We can only get power to construct it by coming to Parliament?—Yes.

712. If upon that occasion any water company, or gas company thinks that its interests will be prejudiced by the application, it will be at liberty to oppose it; the Bill says, "This Act shall apply only to the several subways under any street constructed under the powers of the respective Acts set forth in the schedule to this Act annexed, and to any subway constructed by the Board in the metropolis under the authority of any special Act passed in any future Session of Parliament to which the provisions of this Act are extended by such special Act." We shall have, therefore, to come to Parliament for authority to make any particular subway beyond those which we have power to construct in the present Bill?—So I understand.

713. Then with regard to the requirements of any future case, such as the Strand, or any of those cases put before you, those would have to be considered when

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when we come for authority to construct a subway in the Strand, or in any particular street?—Clearly.

714. So that it would be impossible, would it not, to say beforehand, before the question arose, exactly what number of pipes might be required in those subways, or just how you would make them?—I think it would be just as foolish to attempt to define or to fix a certain amount of accommodation in every street, irrespective of the wants of that street, as it would be to put one main sewer, 10 feet in diameter, for the drainage of a house.

715. Probably one of the first things that you would have to consider when you came for authority to construct a subway would be the nature of the pipes, and how many pipes the company would require, and then you would make your subway accurately?—Certainly.

716. As regards those which are already constructed, you mentioned that those pipes do not communicate through, but only to the houses in the particular streets?—With regard to Garrick-street.

717. But must the pressure upon those pipes for this purpose be just the same as if they went on?—Just the same.

718. Therefore, for all those purposes suggested to you, they are a complete system of themselves?—As far as the risk is concerned, it is precisely the same as to the escape of gas.

719. As to what the pipes would have to do if they were put down in the subway; they would have just the same amount of work to do as though they were put down in the streets?—Yes.

720. And if they were to supply places beyond, you would know that by the mains that are in the streets?—Yes; I think there is room available in both those subways for anything that might arise; I say that there is abundance of room in both those subways; I do not suppose that they would ever be half filled.

721. As to the particular case put to you about the Thames Embankment question, have you power by that Act not only to make your subway, but to make it with all communications, works, and things necessary or proper for the convenient use of it; I am reading from the Act?—Yes.

722. And having power to do that, you say, practically, there would be no difficulty in carrying out that, notwithstanding what is put to you?—We have had very much greater difficulties than those which have been suggested to-day, which we have overcome with reference to railways.

723. With regard to the difficulty of getting these pipes in, they are actually in existence in those streets; it has been done?—Yes; the difficulty has not arisen, but if it does arise, we shall soon find appliances to overcome it.

724. With regard to the cost of removal, which was a matter put to you also, I do not know whether you know that that is provided for already by the present Act, section 5, "Where the Board has before or after the passing of the Act conducted a subway under any street, and a pipe has been laid under the surface of the street otherwise than in the subway, the Board may, by notice served on the company, body, or person to whom such pipe belongs, require them or him to remove the same into the subway, and the cost of such removal shall be determined by arbitration, in manner in this Act provided." Therefore, so far as that is concerned, they would only have to bear so much of the cost as the arbitrator should think fair in the case?—That is the only fair way to do it, because then the arbitrator can take all the circumstances of the case into consideration.

725. A word about what you have been asked as to Monsieur Belgrand; I do not know whether you know that Mr. Hemans wrote to him beforehand to announce the purpose of your coming?—He did so.

726. And though he might not have known you personally, he knew what you were coming for?—I thought he did know me personally, and it was very odd that he did not, because we had met before, and I thought he knew me as well as I knew him; our names were announced, but he was very full of business.

727. You were asked about your conversation on this matter; as I understand it, it was his desire that you should take notes of his evidence and read them over?—Yes.

728. A part of an answer has been read to you, and I understand that he particularly called your attention to his evidence given at question 4664?—He did.

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729. There the question put to him was, "Will you give an account of the explosions and accidents which have taken place from gas pipes in the subways of Paris;" and in answer to that question, he says, "The most serious explosion took place on the 5th March last, in the subway of the Bridge of Austerlitz?" —He explained that afterwards.

730. Did he call your attention particularly to that, and show you by his notes, that what he intended to say was an escape of gas, not an explosion?—He did.

731. Mr. *Duff.*] Were the pipes in Garrick-street laid by the Metropolitan Board, or by the company?—They were laid by the company. In Southwark-street they were laid by the Board.

732. *Chairman.*] In both cases, water and gas?—In both cases.

733. Mr. *Duff.*] When they were laid by the company, did you enter into any arrangement with regard to the responsibilities, supposing there were any accidents?—No.

734. There was no arrangement of that kind made?—No arrangement.

735. Mr. *Floyer.*] How were these pipes actually introduced into the Southwark-street subway?—They were carried through the side entrance; we will show you the spot when you make your visit.

736. Mr. *Paull.*] You say that the chances of escape from gas pipes will be reduced to a minimum?—Yes.

737. It is impossible, I presume, to say that no escape, under any circumstances, could take place?—I think that would be going too far; I do not think that anything can be made absolutely perfect.

738. What I wish to ask you is, supposing an escape of gas should take place, what would be the probable effect of it as regards the vertical shafts and the side passages?—The gas would rise to the level of the shaft, and pass through the mouth of the shafts as fast as it was generated.

739. *Chairman.*] I mean in the event of an explosion, that is, supposing an escape of gas to have taken place, and a light to be introduced, and an explosion to follow, can you estimate at all what would be the result, either to the ventilating shaft or along the side passages?—I should suppose that it would blow the grating off the ventilating shaft.

740. That was what happened in the case of the explosion at Paris, in the Rue de Faubourg, St. Honoré. According to M. Belgrand, the street sweepers were knocked down, and the ventilators of the sewers were blown up as far as the first-floor windows of the houses?—That was a case where there was no gas pipe in the subway; that was where there was an escape from some gas pipes in the ground adjoining.

741. Might not the gas be generated in the sewer; have you not heard of that sort of explosion?—All the explosions have been from the escape of the gas in the ground adjoining.

742. Mr. *Paull.*] But if that were the effect of an explosion of gas outside the subway, is it not reasonable to think that the effect would be more serious if the explosion had been inside?—The gas had got from the outside into the sewer in that case.

743. I understood you to say that the explosion in Paris took place outside the subway?—No; I meant to say that the gas pipe in that case was not laid in the subway, but outside the subway or sewer.

744. From the surface of the street?—Underneath the ground, and the escape taking place, the gas got into the sewer, as it generally does in London; then men going down with lights set light to it, and the gas being in the sewer blew up the grating.

745. Mr. *Paull.*] Does it not follow from that, that if there were an escape of gas in the subway a violent explosion would take place?—I do not think that that does follow necessarily.

746. If a light were introduced it would always do so, would it not?—Not necessarily.

747. *Chairman.*] Was the sewer in Paris ventilated?—I do not know the amount of ventilation, or where the gas was, but if there were some point where the gas could not escape, and where it hung and mixed with the atmosphere, an explosion might take place, but if there is a free current, and mixture of air above, I think no explosion would take place..

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748. Mr. *Paull.*] I suppose, Mr. Bazalgette, an escape of gas taking place immediately opposite one of the side passages, and that the side passage had a mixture of gas and atmospheric air of the most explosive character, would it not be a source of great danger both to the roadway and to the houses?—I do not think that is a state of things that could arise; and I say so because we had in the pipes in Southwark-street a considerable escape of gas, and we put a light to it; we set it on fire, and it blazed, and all the gas that escaped went through the grating, and there was no explosion took place. That was because there was sufficient ventilation.

749. Do you happen to know the proportions of gas and atmospheric air which produce the most explosive mixture?—The proportions are about eight or nine to one.

750. Can you give us an idea of what would be the effect of an explosion of one cubic foot of mixture in those proportions?—I cannot describe to you the effect.

751. You cannot tell how far an iron ball, the size of that tumbler, would be projected?—No; I have never made an experiment of that kind.

752. If the mixture were collected in a vessel formed for the purpose, you could not tell how far it would project the ball?—I have no doubt that considerable force might be obtained in that way.

753. You cannot estimate the number of yards?—I do not know without trying the experiment.

754. Viscount *Galway.*] Your ventilating shafts are the same distance from each other in all the subways?—In Garrick-street they are 80 feet, and in Southwark-street they are 100 feet wide. There is a difference of 20 feet.

755. Is any light required in the subways?—We have used gas whenever we have done anything in the subway; but we have made experiments, and we find that even in that distance, with reflectors, we can get sufficient light without the aid of artificial light, and, of course, by putting them nearer we should get stronger light.

756. Would it not be a safeguard to have a light burning in the tunnel continually?—I do not know that it would, although gas engineers always have a light burning where they are making their joints.

757. *Chairman.*] Would it not improve the ventilation if there were a light burning in the tunnel?—No doubt it would increase the draught, but I do not think it necessary; in fact, in that subway, if you hold up a candle, you find the flame of that candle, at times, almost at right angles with the candle, there being so strong a current of air.

758. Mr. *Duff.*] That current is produced by the difference of temperature in the atmosphere, is it not?—It is partly produced by that, and it varies with the wind above.

759. If the temperature were higher outside than it was in the subway, and if there were an escape of gas, the gas would not escape through the ventilator?—Yes, the gas would escape.

760. If the temperature were higher?—Yes, the gas would rise under any circumstances.

761. Though a colder temperature?—Yes.

762. *Chairman.*] It would rise into the atmosphere?—Yes; a balloon would rise until it reached an atmosphere as light as itself, under any circumstances of temperature.

763. It was given in evidence the other day, at Nottingham, that the temperature was lower in the subways; in such a case you think gas would rise?—Yes; I think there is no doubt of that.

764. Have you made any experiments as to the temperature of subways?—Yes; and they have been tolerably uniform.

765. Viscount *Galway.*] What has been your lowest point?—Varying from 50 to 60 degrees.

766. I think that in Nottingham the gentleman gave evidence that it went down to 40 degrees; but that was in severe frosts?—I cannot tell you the extremes; I have not conducted experiments with that view.

767. *Chairman.*] Have you been in Nottingham to see the experiments there? —No.

768. Mr. *Bagwell.*] You stated that you attributed the explosion in Paris to the deficient arrangements for joining the pipes?—I think that in the accident in Paris

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Paris the explosion took place in the pipe; there was a long length of pipe. If it had been lying in the open air exactly the same explosion must have taken place; one end of it was a gas pipe charged with gas; it had a defective valve, and the escape of gas took place into the pipe. They drilled two small holes in the pipe, and the fact was, that the gas escaping could not pass through the holes, but passed along, and mixed with the air, and formed an explosive mixture along the whole line of the pipe; I think, therefore, no doubt that a light put in the pipe caused the explosion, and that it did not take place in the subway at all; we are quite convinced that that was the case.

769. *Chairman.*] As to the joints used in Paris, are they pipes socketed, as ours are?—No, they are brought end to end; and an india-rubber band is placed round where they come together.

770. That is the case with regard to the cast-iron pipes; how do they manage with regard to the wrought-iron pipes?—They are rivetted.

771. Are they very common?—They are introducing them now; I do not know that they are common.

772. Rivetted in their length?—Yes.

773. How is the joint made?—Much in the same way.

774. With butt joints?—Yes.

775. With no flanges?—No; the one is pushed into the other, and then covered round with a band.

776. How is the band secured?—By its own elasticity.

777. But that gives way under certain circumstances, does it not?—Yes; it is a very defective joint.

778. And then the gas escapes?—Yes.

779. What is the custom in England?—We have a socketted pipe filled in with hot lead.

780. Mr. *Paull.*] Is there any advantage that the public would gain by having these pipes in the subway, beyond the avoidance of inconvenience arising from the breaking up of the streets?—That is a great advantage.

781. Is there any other?—There is the advantage you derive from being able more readily to look at the service pipes and their connections, and see if anything is wrong with them.

782. I am speaking of the public; that is rather an advantage to the companies; but is there any other advantage that the public would reap beyond the avoidance of the breaking up of the streets?—No; but I think that is a great advantage.

783. *Chairman.*] Would not the consumer of gas have an advantage in that particular, resulting from the immediate and convenient access that would be afforded?—Yes; I say that he would have the advantage of the pipes being more readily got at and examined.

784. Mr. *Paull.*] Do you mean to say that if the gas and water companies are to pay rent, that the consumers of either commodity will reap any advantage; will they not be charged higher for water and gas?—I apprehend that it will be a considerable saving to gas and water companies. I believe that if the gas and water pipes are put in subways, that even if the companies pay a rent for them, it will be a considerable saving.

785. Why?—There will not be the escape of gas that takes place now to a very large extent, and that will be a very large amount of saving, and there will not be the same cost of repairs and making good defects, beyond which there will not be the same cost of main originally.

786. Viscount *Galway.*] What arrangement is proposed between the companies and the parties building this subway, as to admission to them; will the subways always be open?—The best arrangement will be to appoint an inspector, a person who shall have charge of the subways, and who would admit the servants of the gas company, and go with them whenever there was anything to be done with the pipes; so that no one company could go in and injure the pipes of another company.

787. Would there be any difficulty in coming to that arrangement?—There would be no difficulty whatever.

788. Mr. *Cornwall Legh.*] Who is to pay for the inspector?—I think he should be paid by the Metropolitan Board of Works; but that would be a matter for consideration by the arbitrator.

789. *Chairman.*] That would not be a matter of much amount; I suppose two

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two guineas a week would do it?—Yes, and possibly he might have other duties to attend to as well.

790. Mr. *Paull.*] What is he to inspect?—He is to inspect the subway, to pass through periodically, and see that there is no defect; but if there is, to give notice of it.

791. Do you think that either the gas or the water companies would be justified in being satisfied with an inspector at two guineas a week?—I would not ask that they should. I would give them every facility to inspect themselves, but if more than one officer were appointed for that purpose, I think that the officers should not have admission, except with a person who would represent all, and see that no damage was done.

> Mr. *Clerk* handed to the Witness a statement of the information with which he had been required to furnish the Committee.

[The Witness was directed to withdraw.

Mr. *George Willoughby Hemans,* called in; and sworn.

Mr. *G. W. Hemans.*

792. Mr. *Wilkinson.*] You are an Engineer of considerable experience, and have been engaged in works of large importance?—Yes.

793. You have directed your attention to subways, and practically both to gas and water pipes?—Yes

794. First let me direct your attention to the examination you made in Paris; in March 1867, you went, by the desire of the Metropolitan Board of Works, over to Paris to examine into the Paris system, and communicate with M. Belgrand?—It was in March 1864.

795. But you went also in February 1867, did you not?—That was my last visit.

796. It was on that occasion that you, in concert with other gentlemen, prepared the report read by my learned friend?—Yes.

797. Before you went, did you write to M. Belgrand, apprising him that you had been requested by Mr. Bazalgette, who held in London the same situation that M. Belgrand occupied in Paris, to present his compliments to M. Belgrand, and to say that he was charged with the duty of preparing a proposition for placing the gas-pipes of London in subways, and asking him for an interview?—I wrote that letter to him one week before we went for the special purpose of there being no mistake as to the object of our visit.

798. That letter expressly names Mr. Bazalgette, and describes the office he fills, does it not?—Yes. The letter was written expressly for the purpose of introducing Mr. Bazalgette and the object of his visit, so as to be sure that we should find M. Belgrand in his office, and be able to get the information sought.

799. *Chairman.*] Is this doubted, because, if not, why are you going into this matter?—Not at all.

800. Mr. *Wilkinson.*] Some observation was made during the examination of Mr. Bazalgette, which might lead to the inference that M. Belgrand did not know with whom he was conversing, and you wish to explain this to the Committee?—Yes. Something has been said about violation of confidence, and all that nonsense, and I wish to show that every precaution was taken to avoid everything of the kind.

801. *Chairman.*] You wrote and made the appointment?—Yes; and I saw M. Belgrand and introduced Mr. Bazalgette myself.

802. Mr. *Wilkinson.*] Before you saw him, you had written that letter mentioning M. Belgrand, and the purpose for which he sought the interview?—Yes.

803. Then you saw M. Belgrand in company with these other gentlemen, and you went with him and his officers through these various subways?—He did not accompany us. He gave us a copy of his London proof to be corrected, and a copy of his report upon the last explosion, but he did not go with us.

804. With regard to the London proof to be corrected, do you mean that he gave you then the draft of the evidence which he wished to be understood as having given in 1864?—Precisely; he stated that it required correction.

805. He gave it to you because he stated that the evidence as it appears on the

notes required some correction, in consequence of imperfection in the translation?—Yes, precisely.

806. Do those notes, as given, form Appendix *A*. to your Report?—It is the translation of those notes.

807. So that, in fact, this Appendix A. would be the corrected transcript of the evidence which appears in print in the examination of 1864?—Precisely; there is only one slight correction.

808. That correction being, as I understand, that the translation of the word "fuite" should be rendered as "escape," instead of "explosion"?—Yes; it was merely an escape of gas on the Bridge of Austerlitz; and not an explosion.

809. Did you ascertain upon that inspection which you made in company with Mr. Bazalgette, the position of the water pipes in Paris?—I had ascertained the position of the water pipes in the large subways in Paris before, in 1864, but I saw them again upon my last visit.

810. When was your last visit?—This year.

811. Mr. *Wilkinson.*] That is the visit upon which this report was made?—Yes.

812. With regard to the water mains, did M. Belgrand himself express satisfaction with the conduct of municipal authorities in Paris in respect to their arrangement and disposition in the subways?—All the engineers were perfectly well satisfied with the condition of the water mains in the subways.

813. Is it the fact that all the subways constructed in Paris are now furnished with two water mains, the one for public service, the other for house service?—All the principal ones I saw had them.

814. *Chairman.*] One for the great street watering, and the other for the houses?—The one I looked upon as the carrier through main, and the other as the service main.

815. Mr. *Wilkinson.*] Did you also ascertain that the special galleries and subways are not placed under constant supervision, and are not visited except when external signs make known the fact that there is a strong escape of gas?—Yes; that was stated by various parties that the subways across the bridges had been left to themselves until any escape rendered an inspection necessary.

816. Did M. Belgrand himself mention that as an objection that struck his mind to the introduction of gas pipes in subways?—Yes; he said that they would be, and were so neglected, that it was impossible to control the escape of gas in the subways.

817. With reference especially to that accident to which allusion has been made in the Place Napoleon Trois, do you remember his stating that the reason why there had not been more accidents was, that constantly two workmen were there, who were charged with the care of the drains, and that they made known any escape of gas as soon almost as it occurred?—That was one of the reasons alleged in his report.

818. Now, let me direct your attention to the accident upon which you have reported, and with reference to which the report has been read, will you state precisely and shortly to the Committee the reason why you disagree with M. Belgrand in considering that a fair test of the danger of gas in subways?—I have a drawing here of the subway upon the Bridge of Austerlitz, and another of the subway in the Place Napoleon Trois, and I can explain what induced me, and the engineers accompanying me, to come to the conclusion that the explosion had nothing to do with any escape of gas in the subway at all. This is a drawing (*producing same*) from a tracing I made myself from the design of the engineers of the bridge.

819. *Chairman.*] This is the Austerlitz bridge that you are talking of?—Yes; that was the only subway explosion of any consequence. It appears that the pipe in that gallery originally laid in a very small subway, not at all to be compared in size with ours, either with regard to space or ventilation. It laid there alongside of a water-pipe, and the dotted lines in that drawing show what the gallery originally was. The full lines show it as it was afterwards altered, but the pipe remained for a long time in a very imperfect state, according to the report of M. Belgrand and his evidence. It was in a bad condition. The joinings were bad, for they were effected with indiarubber, which corroded, and they consequently leaked, and there was a great escape of gas. When M. Belgrand gave his evidence here in 1864, he stated that the escape of gas was such that a workman was very nearly suffocated. The word he then used for "escape" was translated

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translated wrongly as "explosion." It was merely an escape, but it was an escape of so large a character that one of the men was nearly suffocated; he was drawn out insensible. After that they took out this defective pipe, and they put in a new one. That was done in January 1865, the following year. The new pipe was one of better construction, but to put it in they stopped the gas at the inner end of the pipe on the left bank of the river by a valve; they then took up the old pipe and put in the new one; but during the whole of the business, which lasted several weeks, it was known that the valve, which was put there to stop the gas, leaked, and that gas was constantly passing through that valve. At last, after several weeks' working, and when the new pipe was very nearly joined to the old one, the leakage having gone on, the explosion took place; and, in apprehension of that explosion, it is stated in the Report, Appendix B, that two holes had been made in the new pipe, very near the valve, for the purpose of allowing, if possible, the gas to escape. Those holes did not appear after the explosion took place, but it is assumed that those holes were put there. The pipe was about 170 yards long, and from the current of air which those holes would have caused, or even without the current of air, but with the constant leakage of gas, it is quite clear that the manufacture of explosive mixture was going on in the pipe exactly in the same way as there was when the explosion took place in the trench in Holborn. There had been a bladder put in in that case, and that bladder had collapsed and allowed the gas to mix with the atmospheric air that caused the explosion. It had nothing to do with the subway. Here we had in Paris precisely the same thing. There was a constant leakage into a pipe, which was open at the other end to the atmospheric air, and explosive mixture was formed. A light was accidentally put to it; how, is not known, because one man was killed, and the others were so confused, that they could give no evidence upon the subject. The explosion took place. It is perfectly evident that that explosion took place in the pipe, and not in the subway, because it was stated by all the witnesses that the pipe opened itself out—*developé*, that is, opened from the inside. We therefore came to the conclusion that that explosion was precisely similar to the one in Holborn; that it could not be avoided upon applying the light; and that it had nothing to do with the subway. Further, we remarked that that subway was not all a subway like these. It was a sort of passage under the parapet of the bridge, and could not be compared to these in any way. As I am explaining what we saw in Paris, I may as well say that we could discover throughout the whole of the subways of Paris only this record of an important explosion. Against that we have a pipe which has been laid in a subway, of which this is a drawing (*producing same*), for 12 years without any inconvenience of any kind. There is a gas pipe there 10 inches in diameter, and a water pipe on the other side. That is in the Place Carrousel, in close proximity to the Tuilleries, and there has been no kind of accident there. It is in the square of the Louvre, close to the Tuilleries. It is nearly half a mile long. They say that an explosion took place in the Gallerie de Martyrs, but that was 35 years ago. We could get no authentic details of it, and, therefore, we judged from what we saw in the Place Carrousel and the Pont d'Austerlitz.

820. Viscount *Galway.*] What is the height of this subway?—Four feet 3 inches. When the pipes were doubled, it was 6 feet. It is now only 4 feet wide. They have turned the gas outside, and put it in a heap of sand, and they have retained it in its original position.

821. *Chairman.*] Was it ventilated?—We saw in the spandrels of the bridge some very small openings, but we could not ascertain distinctly whether they had been originally there, or whether they had been introduced after the accident. Half the people said one thing, and half the other.

822. Viscount *Galway.*] Was there a current of air through it?—There was some ventilation.

823. Mr. *Paull.*] There was no light in it?—There was light from the trap that admitted us.

824. But no light continually?—No; there was not sufficient light to do anything.

825. *Chairman.*] Was there as much as in the London subways?—No; nor was there sufficient ventilation.

826. Viscount *Galway.*] Was there a sufficient current of air to carry away anything?—At the time of the accident it was said that it was open at one end; it

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it must have also been open near to the mason that was working with the object of closing the vault by the valve; that mason was killed by the explosion.

827. Mr. *Cornwall Legh.*] Did you not say it was open at the end?—Yes.

828. Then at that end atmospheric air got in?—Yes.

829. Consequently, there being an escape of gas, the explosive compound was forming?—It could not help forming, because the gas continually passed into the pipes, and had been doing so for weeks.

830. *Chairman.*] You say it was in the pipe and not in the subway?—Yes; because all combined in asserting that the pipe opened itself out; if it had been the gallery alone, that pipe would have crushed in; it could not have been opened out.

831. Mr. *Wilkinson.*] That being the case, being in the pipe itself, no ventilation would have helped it?—Nothing.

832. Then this is the result, that the first explosion on the Austerlitz Bridge was no explosion but a leakage?—Yes.

833. The second on Austerlitz Bridge you have explained?—Yes.

834. Besides this, there was no explosion but one 35 years ago?—Yes, that is the one which it is stated took place in the Rue de Martyr; in addition to that in the corrected notes of M. Belgrand's evidence, he furnished you with 16 explosions in which there was no gas pipe in the subway?—Yes, they actually arose from the present practice of laying the gas pipes in the ground contiguous to the subways, and from the pipes being leaky, the gas finding its way from the leakage into the empty space. The gas having leaked escaped to the nearest place, which was the sewer, and then exploded; that will occur continually, of course.

835. Mr. *Cornwall Legh.*] Was it the gas pipe or the gallery that was open at the end?—I think both were open at the end. The gas pipe was altogether open at the end; but we believe that part of the gallery was open at the end where the men were at work, for the purpose of making the closure, putting on the last joint or two.

836. But if the gas pipe was open at the end, surely there was a constant escape?—A long pipe of 170 yards long, with the filtration of gas in small quantities at one end, and that being drawn through by a current of air until it formed an explosive mixture.

837. Was it cut off at both ends?—No; at the near end it was joined to the valve.

838. *Chairman.*] Was the valve closed?—It was closed, but it was notoriously leaky; they knew that it was leaky all the time.

839. Mr. *Wilkinson.*] With reference to the questions which have been put to you by the Honourable Member, I will ask you to attend to this. I am now going to read to you a short report of M. Belgrand, and I shall ask you if it is a correct report of the accident:

"A formidable explosion of gas has taken place this morning, at half-past nine o'clock, at the d'Ormont Gallery of the Austerlitz Bridge. The arch of this gallery, in brick and cement, has been completely destroyed and overthrown for about a length of 160 metres (520 feet); it is burst, and will have to be reconstructed along the remainder of the length of the bridge.

"The gas lamps have been overturned, the gas main of bitumenised sheet iron, of 50 millimetres, which the company were laying down, has been almost entirely destroyed. The 50 mm. cast-iron delivery pipe from the Austerlitz engine has only been broken at one point, and an enormous jet of water has entirely traversed the road, and overturned a gas lamp on the other opposite pavement; the water has been immediately stopped. The workmen of the company working in the trenches at the two ends of the bridge, three on the right bank and one on the left bank, have been injured; one has been killed, the other three more or less wounded.

"A fifth, who was on the middle of the bridge, has been thrown by the explosion into the middle of the debris, and fell again into the trench without being hurt.

"A woman, who was also on the footpath, likewise fell into the subway, but did not appear to be hurt, as she went on her way without saying anything.

"I will now state, according to the information which we have gathered on the spot, the circumstances under which this accident took place.

"The company were replacing a cast-iron main, jointed on the Desperdaux system by a 50 mm. main of bitumenised sheet iron.

"This new main was connected with the old one on the left side, and the circulation of gas was intercepted on this side by a valve.

"All the crossing of the bridge was done, and the extremity of the last pipe on the right

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> right bank was gaping open. In the trench, as an increased precaution, two holes were made in the pipe next to the valve to cause the escape of gas to flow from the interior.
>
> "In this condition any accident seemed impossible, and for a month the workmen of the company worked under the gallery in perfect safety.
>
> "It is absolutely impossible to indicate the causes of this accident. It is certain that the valve closed badly, that the main being laid, and the gallery filled with an explosive mixture, that some accidental cause, very likely the introduction of a match or the end of a cigar, ignited this mixture. It has been put forward that it was the escape of water which caused the bursting of the arch.
>
> "This cannot be seriously maintained. The explosion was heard at the Napoleon Bridge, and also at the island Louvier; a flow of water does not make a noise. Again, the water main is only destroyed at one point, and remains intact elsewhere, whereas the gallery has blown up for a length of 160 metres (520 feet); the gas main, on the contrary, is completely laid open and destroyed."

That is the account given by M. Belgrand?—That is the report he gave to us, and it coincides with the circumstances we heard from other parties.

840. *Chairman.*] I wish you would read that last part again. What did it say about the gas main?—That it was laid open and destroyed.

841. Viscount *Galway.*] Was that cast iron, or of what material was it made?—The bituminous sheet iron pipe. It was an improved pipe.

842. Mr. *Wilkinson.*] That shows that the explosion was in the pipe?—Yes.

843. Well; Mr. Hemans and you gave evidence in 1864, before the Committee. I do not propose to go into that at any length, but I will ask you whether you confirm now all that you then stated?—I certainly do; I am of opinion that it is desirable and most proper to lay the gas and water pipes in the subways.

844. Your subsequent experience has not shaken that opinion?—I think that the two and a half years which have elapsed since, have been sufficient to show that no harm can result from adopting such a course; nothing has occurred in Paris, nor in the subways in London, nor in those of Nottingham, to induce me to change my opinion.

845. What do you see with regard to the expense; do you think that there is any objection upon that score?—With regard to the expense of laying of pipes, we have not experience enough to be able to make exactly any comparison of laying yard for yard of all descriptions of pipe in the subways, but I cannot help believing that it will be cheaper to lay the smaller pipes; with regard to the larger ones the expense may be greater, but the additional expense must be very small, and at any rate it cannot be sufficient to form any serious objection.

846. You think that the expense of laying the larger pipes will be greater?—Yes, I think that with the larger pipes the companies may be put to more expense in bringing them in.

847. While upon that point, let me ask your opinion as to whether there would be any difficulty in the introduction of those large pipes to the subways?—None whatever; that is the simplest engineering question in the world; indeed I cannot understand how such difficulties as those which have been mentioned could be suggested.

848. However large the pipe there would be no difficulty, you think, in introducing it to the subway?—The largest pipe is the 36-feet main. There is no difficulty in supposing from 1 to 500 yards of them being required; you would simply have to make an opening 10 feet long, so that sufficient ventilation may be obtained; then you put a movable frame around it; you make an opening in the crown of the arch, and you let down pipe after pipe to the place where it is to be laid; it is the simplest thing in the world.

849. With regard to the size of the subway, is there any difficulty in constructing the subway large enough to admit pipes of such magnitude?—It is obvious that a subway might be at least five times bigger than they are now made, without interfering with anything upon the surface of the street; the only difference would be the increased expense.

850. Do you concur with Mr. Bazalgette in thinking it desirable, first, that the companies should indicate their requirements rather than that he should prepare a scale for them?—It is impossible to know what to provide for when they speak of four 30-inch mains in the same place; I doubt very much whether there is such a thing; if such a thing were required, it would be necessary to make another subway to hold them; I do not think that that number of pipes could be got into the present subway, but a great additional space could be added

to the present subway by taking away the gravel about here (*explaining the same on the map*), which I think is unnecessary. All this dark space here, within the span of the arch, might be taken away; the foundations go down nearly as low as the cross pipes into the sewers, so that there is a great deal of space that might be added.

851. *Chairman.*] That is gravel on the concrete?—I do not think there is any concrete now round the sewer. This is the foundation of the subway; therefore, all this material is useless, and it might, therefore, all be taken out. It might be necessary to put a little concrete here, at the shoulder of the arch, but there is a large space here that might be used.

852. Mr. *Wilkinson.*] Now let me direct your attention to what has taken place since you gave your evidence in 1864. You have seen both the subways constructed by the Board of Works; the one in Southwark-street, and the other in Garrick-street?—Yes.

853. Tell me your experience of the Southwark subway; when did you last visit it?—I visited it last week.

854. At that time you found these pipes charged with gas in it?—Yes, several; and I remained whilst almost everything was done there which it has been said here could not be done with safety.

855. Were there two pipes of 18-inch diameter, two pipes of 10-inch diameter, and one pipe of 6-inch diameter, in that subway?—Yes; nearly as many as there are there (*pointing to a plan*), and one has been added since. Several of them were charged with gas under a pressure of two inches at the time.

856. Now about the space; was there room sufficient to manipulate the pipes?—I saw the joints made and driven in, and hammered down to that large 18-inch pipe on the left-hand side. I saw the same thing done with the 6-inch pipe close to the wall, and it was all done without any difficulty.

857. As to the mains, does that map correctly indicate the arrangement of the pipes?—Yes; they are slightly altered with regard to the bearings, but practically that is the position in which those pipes are laid.

858. Is it the fact that there is a tramway there about three feet wide?—There is room for a tramway; none has been laid down at present.

859. Now tell the Committee the operations which you saw performed in that subway?—I saw all those operations performed which have been here stated to have been so dangerous and impracticable in the tunnel.

860. Did you see the 18-inch diameter pipe jointed by running in the usual charge of melted lead?—Yes.

861. Did you see the 6-inch pipe treated in the same way?—Yes.

862. And did you see a hole tapped in the 10-inch pipe while it was fully charged with gas, a screw thread made, and an inch and a half service pipe screwed in, the junction being effected without the slightest danger?—Yes, the operations took place in half an hour; there was a slight leakage of gas, which was checked by a little clay, but it was so slight that we had open candles around it, and the men were not at all alarmed, nor indeed was any one present who witnessed the operation alarmed.

863. Did you see a 2-inch diameter flexible hose introduced?—Yes.

864. And all those operations were conducted with the light of open candles?—Yes, and the lead was melted.

865. I was going to ask you that; was there not a furnace brought in for the purpose of melting the lead?—Yes, the furnace was carried in, emitting at the time a great deal of flame and smoke.

866. And did you see every operation performed without danger?—Yes, and I cannot understand any other operation that could be required of a more dangerous description. In fact, that insertion of the one and a half inch service main would not be necessary, because they ought to be laid on at first, so as to require no addition afterwards.

867. Will you repeat that answer?—I say that there ought to be no occasion to put in service mains after the pipes have been charged, because the central galleries indicate the places where those things will be required, and there can be no difficulty in putting in, at the time the pipe is originally laid, a short length with a cock, to which the long branch may be attached when required.

868. *Chairman.*] You mean that that should be done upon the original laying of the main?—Yes; upon the original laying of the main.

869. And before it is charged?—Yes; before it is charged with gas.

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870. Mr. *Wilkinson.*] Did there appear to you to be plenty of room, not only for the tramway, but for the pipes, and for the workmen to perform these various operations?—Plenty.

871. You have explained that more room might be obtained by burying some of the pipes?—You could put as much as is shown above there under the line that is filled up.

872. Almost double the space would therefore be obtained by that means?—Yes.

873. Now I must ask you one question with regard to the light; these operations were performed by candle-light. Did you make any observation as to the actual light in the subway?—There is part of the subway ventilated and lighted by an aperture of two feet opening. There is quite light enough to get along without any special apparatus; by holding a reflector under each of these shafts, a large amount of light was thrown between the two openings, so much so, that a great number, if not all the operations, could be conducted.

874. What sort of reflector did you use?—It was a simple piece of white paper on a board; but of course a glass reflector would be a more efficient one.

875. With that mechanism the light of day was sufficient to afford light enough to manipulate the gas pipes?—Scarcely sufficient to effect an intricate operation, but I think that they could take the lead, and run a joint with that light; I am sure if it had been a silvered glass instead of paper, that that could have been done.

876. Was the draught of air in the subway considerable?—Yes; I have been frequently in the subways, and I have found that every ventilator had an upward current.

877. Would that be enough to take the gas with it, and prevent an explosion?—Whatever gas escapes it must go to the top, and, being at the top, it will find the holes and get out.

878. With regard to the strength of the draught, would that be sufficient to overcome any occasional density of atmosphere that might affect ordinary ventilation?—You mean with regard to the escape of gas. The more dense the atmosphere the quicker it would escape.

879. So that a November fog would be no additional danger?—The heavier it is the quicker the gas will rise up and go away.

880. As we see it illustrated in the ordinary case of a balloon?—Yes.

881. Upon the whole, the result of your evidence is that you are still as warm an advocate for the introduction of the subways as you were in 1864?—Yes.

Cross-examined by Mr. *Burke.*

882. And your advocacy is to introduce into London that which every engineer in Paris considers to be an idea exploded, from its being so much attended with danger?—I must deny that proposition entirely, for we have evidence that the Imperial engineers have kept them in the Emperor's palace.

883. There are a certain number of persons to whom these matters are entrusted in Paris, and, under the advice of that combined body, Paris declines to run this risk; is not that so?—No; I think that Paris continues to run the risk at the most important point.

884. In some places they do, where they cannot avoid it?—There is no reason why they should not avoid it if they wished to do so.

885. Comparing the various districts of Paris, one with another, and taking the districts in which the pipes are so laid, what proportion do those districts bear to the whole of the streets of Paris?—That which I rely upon is the experiment in the Place de Carrousel; it is only half a mile in length, but it is in the most important part of Paris.

886. I will admit that in a length of that kind years may elapse before any accident may happen; but is it not the fact that Paris declines to lay gas pipes in its subways, on account of the danger attending such an operation?—I cannot deny that hitherto engineers have had this apprehension, which appears to be very ill-founded, with regard to the danger attending the introduction of gas to the subways.

887. Looking to the care bestowed upon the streets of Paris, I apprehend that

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that the breaking up of the pavement there is just as much disliked as it is in London?—I do not think so. The thoroughfares in Paris are wider, the traffic there is not so dense, and I do not believe that the nuisance of obstructing the traffic can be anything so great in Paris as it is in London. I do not think gas is so extensively used.

888. Gas not so extensively used?—I do not think so; but I will not give positive evidence upon that.

889. All I can say is, that I thought it rather lighter; but, however, whatever you think about it, Paris does object, does it not, to having gas pipes laid in the subways?—There is one gas company only, instead of 10 or 12 here.

890. They would, therefore, the less interfere with the streets?—No doubt the annoyances are not so great as in London, for that reason.

891. Just let us suppose a case; I will admit that years might elapse before an accident took place; but let us suppose that an accident did occur, and take, as an example, an explosion in a subway, what would be the effect upon the street; would it not be to blow up the whole street?—In the first place, I do not see why the subway is to increase the difficulty. I believe that gas will always be dangerous so long as it is used; but why a subway is particularly to increase it, I cannot see; I think it would rather diminish it.

892. If gas is laid down in the earth, as it is now, no escape can take place, and therefore no explosion would take place?—That is directly contrary to the evidence of M. Belgrand, who gave us 15 or 16 explosions resulting from the present system. The gas does escape. The joints draw, and the gas escaping, finds its way through the earth to the nearest sewer, and there it explodes.

893. I am taking London; we have had gas in London now for half a century; you never heard of an explosion of a severe character arising from the cause you have mentioned?—Yes; the explosions have all occurred from that cause; none of them had occurred in subways.

894. What explosion has occurred from an escape of gas in the earth?—I have no sufficient knowledge of the London explosions to be able to tell you that. I have investigated the Paris explosions, and I have given you a description of them.

895. You are speaking of what you have heard from another person there; but I ask you, from your own experience as an engineer, whether you have ever known such a thing as an explosion from gas escaping in the earth?—I am not aware whether the explosions that have occurred arose from any escape in the earth, but it is clear that there have been explosions in Paris from that cause.

896. In Paris you go to M. Belgrand; but I ask you with regard to your personal experience of such matters in London; taking your own experience, you have heard of no such thing?—No; but I think it a very probable thing to occur.

897. Never mind about the probability; we have had 50 years of experience in laying down gas pipes according to the English mode; have you ever known such a think as an explosion of gas arising from that mode of laying the pipes?—I could not put my finger upon any particular case. I think explosions have arisen from that cause, but I could not give you any special instance.

898. So far as your experience goes, there cannot be any very serious cases, or otherwise you would have heard of them; you never, for instance, heard of a street being blown down?—I do not profess to be a gas engineer, any more than M. Belgrand himself does, but such things might have occurred.

899. Supposing an escape took place in a subway, with a large mixture of atmospheric air, instead of being in the earth; let us suppose that the escape of gas were in the subway, with a large mixture of air, and then an explosion taking place, would it not be precisely the same as if you were to lay down in every street in London a large train of gunpowder?—No; I think that is a most exaggerated view. I will explain to you what I mean. There is an opening of two feet diameter at every 200 feet in that subway. You cannot suppose that the explosive mixture would go past these openings and not escape. You cannot expect that all the subways of London would be saturated with explosive mixture in that manner.

900. I am putting a suppositious case, and imagining an escape of gas to take place in a subway, with a large amount of atmospheric air; would not the mixture become explosive?—Yes.

901. Then if there came a light into the mixture, the result might be such as

to blow up the whole street, might it not?—You might as well ask me whether if you were to fill the subways with gunpowder, would it not be very dangerous. Why, of course, if you put the supposition that the subways are filled with explosive mixture, the subways would be blown up.

902. Well, but they entertain so much apprehension of that in Paris, that they decline to admit them upon that account?—I suppose that is so.

903. You want to make the experiment on the *corpus vile* in London, with that which in Paris they, with their long experience, decline to accept?—They have no long experience. I think our experience in Nottingham is greater.

904. Who sent you over to Paris to inquire into these matters?—I was sent by the Board of Works.

905. To get up a case for this Committee?—I think that is a very unfair way of putting the thing.

906. I only want to know this: you were employed, were you not, by the Board of Works, upon the last inquiry as a witness, and were you not sent to Paris to prepare yourself as a witness to support this Bill. That is a very simple question?—I was sent there to make a report to guide them in respect to their Bill.

907. *Chairman.*] Were you sent there to inquire into the nature of these accidents?—To inquire into and report upon them.

908. Mr. *Burke.*] Now, with reference to what you have said in answer to my friend, let me ask you this question. Do you suppose that in these subways the pipe originally laid should remain for ever, and that there should never be any change in it?—I do not see why it should not remain, as long as it is not imperfect.

909. Yes; but supposing the pipes laid down by a company are found to be insufficient for their increasing supply?—They must put another down.

910. Then you would have to perform the operation of taking away a large main, and substituting a still larger one?—I do not see why you should not duplicate the mains there.

911. Would the subway be of sufficient capacity?—For a long time to come; and if not, another might be made.

912. Supposing they were not found, for all time to come, to be large enough, how would you enlarge them?—In all time coming, we should not find room enough for water, gas, or anything else, if London increases as it has been doing lately.

913. Is it not the fact, that every company has found it necessary to increase their mains?—All London companies have been getting their 10 per cent., and if business increases in that way, I think it will be quite as well to increase the subways.

914. If they get 10 per cent. we may assume that it has been got by an increased supply, which is pertinent to my question. Is it not a fact that, by the increased consumption of London, they have found it necessary to lay down larger mains?—No doubt.

915. So that you would suppose all these operations are to be carried out in the subways?—Yes.

916. You admit that it might be necessary to enlarge the subways?—It might be necessary to enlarge the subways.

917. Under whom do you propose to place the control of the subways?—That is scarcely a question for me to answer. I should think that the Board of Works, being the proprietors of the subways, ought to have the general control of them, and that there ought to be regulations for the admission of the gas and water inspectors.

918. Are you not aware that the gas companies and the water companies have constantly need to lay down service-pipes, and to alter service-pipes, and to cut off supplies?—No doubt.

919. Would you admit them at all times into the subways to conduct those operations?—Well, I think that they ought to be admitted in company with the persons in charge of the subways.

920. Are you to have, then, a staff of servants who are to superintend the gas and water services, or are they to send from time to time, as they do now, persons in their employ, to use their discretion in cutting off and laying down services?—No; I think that the subways would require special regulations.

921. Under whose charge are those special regulations to be placed?—That might

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might be apportioned by arbitration in some way between the Board of Works and the water and gas companies.

922. At this moment they employ their own servants to do the work without the necessity of anyone else accompanying them?—No doubt.

923. Then, in every case in which a company wanted to lay down a service, you would require their man to be accompanied by a man belonging to the Board of Works, and the company to pay the man?—That I would leave to arbitration. There ought to be a joint arrangement.

924. You admit, I suppose, in fact, there can be no doubt of the fact that there must be a peculiar amount of care adopted in all these operations under the apprehension of an escape in some way?—Certainly.

925. Do you think that in all cases you can insure that care on the part of all the subordinates? Do what you will do, do you think that you will ever be able to insure that?—I think so, with good regulations, and if there is any apprehension entertained, the men would be careful on their own account.

926. Let us take a violent supposition, that a man, for instance, wilfully made an escape for any purpose of his own. What would be the consequence? They cannot do it now?—The consequence would be, that with proper inspection it would be detected in a few hours.

927. Suppose that in that few hours the leakage was to become dangerous? I should go in with a safety-lamp and put out the leak.

928. You would draw it off?—I should stop the leak.

929. That you think would be an easy operation?—Certainly; why should it not be perfectly easy.

930. How do you propose that these services should be laid in connection with the water pipes and the gas pipes. For instance, those represent gas pipes there, do they not?—Opposite every gallery I would put a service pipe; a short one with a cock upon it, so that you would only have to add the long branch, and turn the cock on when you wanted the gas on.

931. To every house?—Yes.

931*. You would attach the service in the first instance?—Yes.

932. It is in the service pipe, principally, that the leakage takes place, is it not?—There would not be if they were put in that way. I believe it is now because they are put in so badly.

933. Your proposal is to make everything better than it is now?— Certainly; that would follow.

934. But that is an essential feature in your case; that there should be an improvement in everything?—I think that would necessarily follow.

935. Under the existing system escapes do constantly occur in service pipes? Yes; no doubt.

936. Those service pipes would have to be improved?—I do not think that. I think that the service pipes would be much better put on in the way I suggest, that is, that they should be put on originally, and that they should be of such a capacity as not to require any addition.

937. You mean, that a man burning two lights only should have a service pipe that would suffice for 50 lights?—That would depend entirely on the character of the street. With small houses, I would have small service pipes; with large houses, better ones.

938. How long have the pipes been laid down in the cases you have been visiting?—I think 2½ years. The total length is not above a mile.

939. And that is the longest experience you have?—Yes.

940. Are all the houses on either side?—No.

941. And therefore the services are not all laid there, are they?—I think not.

Re-examined by Mr. *Rodwell.*

942. You say there is a great leakage takes place in the present service pipes? —Yes.

943. And that with the method you propose of connecting those service pipes in the subways to be constructed, that leakage would be considerably lessened? —Yes.

944. A saving would therefore be effected to the company in that respect?— Yes; and I think it would be a very important item of saving.

945. Is

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945. Is it not the fact that the work of making these service-pipe connections with the mains is now done very hurriedly ?—Yes.

946. That arises from the necessity which at present exists of taking up the pavement, and their anxiety to get the pavement down again ?—Yes; and from the impossibility of working well in the hurry of traffic.

947. My friend has been rather drawing upon his imagination with regard to the accidents which he has supposed might happen, and he assumes that great care and special regulations will be requisite; but they are requisite now, are they not ?—Yes; or at least they ought to be.

948. We asked you about the explosions that have taken place when pipes have been laid down in the ground, independent of subways ?—Yes.

949. I will refer you to the answer to question numbered 4571, given by Mr. Heywood, in the course of his examination in the year 1864; did you hear him give his evidence upon that occasion ?—No; I was not in the room at the time.

950. Have you read his evidence ?—Yes; I have read his evidence.

951. Do you know that he gave instance after instance of explosions that had taken place in the sewers from the collection of gas from leakage in the gas pipes laid in the ground near to the sewers ?—Yes, I recollect that.

952. *Chairman.*] Was that in London ?—Yes, Sir.

953. Was that Mr. Heywood, the engineer of the sewers ?—Yes; he is engineer to the City of London.

954. Then with regard to the opinion entertained in Paris upon these subjects; my friend asked you whether the Parisian engineers were not afraid of the introduction of gas to the subways; I believe the fact is, that opinion is divided upon the question, is it not ?—Yes.

955. Is it not also a fact that the Parisians, as a body, are very timid about gas, and the introduction of gas to their houses ?—Yes; I do not think they introduce it so freely as we do.

956. Do you know that they are not allowed to introduce it between the ceiling and the floors in the manner that we do in England ?—They are all compelled to be external pipes.

957. There is a feeling generally in Paris of rather more apprehension with regard to the danger of gas than is to be found in England ?—There is.

958. You have been asked a great many questions as to the arrangements of these pipes; I suppose these arrangements will depend upon the particular and special circumstances of the case ?—Yes, of course; they will be adapted to the thoroughfares through which they pass.

959. A different course will be adopted; for instance, in a street like Regent-street, from that which would be pursued in a little street in Whitechapel ?—Yes; and very simple alterations indeed will suffice to make the difference.

960. Viscount *Galway.*] Have you found any difficulty experienced in the subways you have visited in getting men to work in them ?—I never found any difficulty. The men I saw recently working in the manner I have described to you, were doing so with great alacrity and cheerfulness.

961. They did not seem to be in any way afraid ?—Not the least; and everything was done that would be likely to cause danger. When the furnace was brought in for the purpose of melting the lead, it was emitting an immense volume of flame, and yet there was no danger experienced from it.

962. Mr. *Paull.*] Is there any advantage that the public would derive beyond that which would result from the breaking up of the streets being rendered unnecessary ?—I think that would be a great advantage from the non-contamination of the air by the escape which now takes place of gas into the earth. I believe that the London earth is so impregnated with gas, that we often suffer from it without knowing it. The moment a trench is opened in the London streets we are poisoned by the effluvia. I am certain that that alone is a very serious cause of bad health.

963. Still, escaping in that manner, although the air may be contaminated for a while, there is no chance of explosion from it ?—If enough escapes to find its way into a sewer it blows up. It has a tendency to go to the nearest open vault or space.

964. Escaping into a confined place, there is always the more tendency to explosion ?—It is only in that position it can mix with the atmosphere so as to make an explosive compound. About 7 to 1 will commence explosion, I

believe, and it continues explosive from that to to 13 or 14, when it ceases to be explosive.

965. Then if that small proportion get compounded it would make a great breach in the sewer, if an explosion were to take place, would it not?—I have made a calculation that it would take 10 hours of a heavy leakage to put the proper proportion in one length of a hundred feet. I cannot conceive how it would pass one of the large apertures that would exist; but I made a calculation that a quarter-inch pipe would evolve a sufficient quantity of gas in 10 hours to make one section of the subway explosive. But that is such a heavy position to assume, and it is one so unlikely to happen, that I cannot see any danger.

966. Can you form an opinion what number of cubic feet of the explosive compound would be generated at that rate of escape?—Well, the area of the tunnel is about 54 square feet, and therefore there would be 5,400 cubic feet of explosive mixture, which at that rate of escape would take 10 hours to accumulate.

967. *Chairman.*] That is supposing there was no ventilation?—Yes.

968. Viscount *Galway.*] Would not the ventilation be accelerated by a chimney?—There are ventilating shafts now at each end of Southwark-street, and by putting a light in them there would be a strong current of ventilation produced.

969. You would have no fear of an explosion then?—None whatever; if the ventilation is complete no explosion can occur.

970. Mr. *Floyer.*] You spoke of the upper draft through all the openings; from whence did the supply of air come?—It is very difficult to explain these currents; but it is well known that whenever air is warmer in an enclosed place than outside, it rises, and the cold air enters.

971. There must be a supply of air from some other source to enable a stream of air continually to ascend?—The air of a town is constantly in motion. There are constant winds and currents above, and they may cause ventilation. It is not easy to explain why there is a current of ventilation. It is a fact that whenever I have tried these openings there has been a current.

972. It is important in arranging your system of ventilation, that you should know from what source the air is to be supplied?—By putting in ventilating shafts you command it, because it is easy to put small gas lights there, or to light a small fire, and then you compel the current of air to ascend.

973. Is the draft of air upwards in these two ventilatiog chimneys?—Yes, as it is in all chimneys.

974. You do not know it as a fact?—Any one can ascertain it by putting a candle to the chimney.

975. Not in chimneys in constant use?—Yes, in every chimney.

976. Do you say that in every chimney there is an upward current?—There is sometimes; but at all events the moment you light a fire there is an upward draught.

977. That is very true, but as long as the chimney is cold, without any warmth, there is no upward draught?—As long as the air inside is warmer than the air outside, you may have a draught.

978. Mr. *Duff.*] It is not always so in the subways?—There are times when the air would be cooler than it would even by an artificial draught in the ventilating shaft.

979. Mr. *Paull.*] Are you able to say that the system of ventilation would be sufficient to carry off in the ten hours you have supposed the quantity of explosive compound which would be generated at the rate of escape and in the time you have mentioned?—You mean supposing that rate of escape to arise which would be a very large leakage.

980. Yes, 5,400 cubic feet would be generated in 10 hours in an escape from a quarter-inch pipe?—You must follow the argument. It would be thus: In that 5,400 feet there would be 800 feet of gas; that would be about the proportion, and I believe that the ventilation is sufficient to carry that away. It would rise to the top, and would be carried away by the nearest ventilating shaft.

981. Viscount *Galway.*] You would have no doubt of it in case there was a shaft warmed?—None whatever.

982. Mr. *Paull.*] Should I be right in believing that if a very small proportion

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tion, say a 500th part, were left in the tunnel, that a very serious explosion might take place?—I think not, Sir, because I think that this gas would have a great difficulty in mixing in proper proportions with a body of air 54 feet in area. The tendency of gas is to rise, like bubbles in water; it would get into the shaft of the tunnel. There is a tendency to the nearest draught hole, and it goes away. I only say that would arise if the ventilation were entirely stopped, but I do not think that that would occur. I think that the gas would go to the top of the dome, and find its way along that to the first ventilator.

983. Is it true that the gas would go through the atmosphere, like bubbles go through water; would not the density of the air produce a stratum of gas beneath it?—No, that is impossible. That is the principle upon which balloons rise. It is just as air rises in water. It cannot help rising; so it is with gas. The more dense the atmosphere, the quicker the gas will rise.

984. Viscount *Galway.*] How often should these subways be inspected?—I think they should be inspected every day.

[Adjourned to To-morrow, at Twelve o'Clock.

Wednesday, 26th June 1867.

MEMBERS PRESENT:

Mr. Bagwell.
Mr. R. W. Duff.
Mr. Floyer.
Viscount Galway.
Mr. Grove.
Mr. Jackson.
Mr. Cornwall Legh.
Mr. Paull.
Mr. Tite.

WILLIAM TITE, Esq., IN THE CHAIR.

Frederick Joseph Bramwell, Esq., re-called; Examined by Mr. *Cripps.*

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985. I BELIEVE you are a Civil and Mechanical Engineer, carrying on business in Great George-street, Westminster?—I am.

986. And a Member of the Institution of Civil Engineers?—Yes.

987. And one of the Council of the Institution of Mechanical Engineers?—Yes.

988. Now has your attention been particularly called to the question of gas explosions?—It has.

989. I believe you have not been engaged as engineer to any gas company?—No, I have not.

990. In the year 1864, did you go to Paris with Mr. Hemans?—I did.

991. And inspected certain sewers there with reference to the question which was then about to be considered here; the gas question?—I did.

992. Did you also at the same time visit Nottingham?—Yes, shortly after going to Paris.

993. And you also, I think, inspected the subways that were then existing in Garrick-street?—I did.

994. And in Southwark-street?—Yes.

995. And you gave evidence here upon the inquiry, I believe?—I did.

996. Now in the autumn of 1866, did you again go to see the subways at Nottingham?—Both those I had seen before, and also one that had been constructed since I was there in 1864.

997. And did you also, in company with Mr. Bazalgette, Mr. Hemans, and Mr. Boulnois, go to Paris?—Yes, in the opening of this year.

998. And there, in their company, you made a further inspection of the pipes that you went to examine?—I did.

999. I believe you have again more recently visited the subways that are made and existing now in London?—Yes, both in Garrick-street and in Southwark-street.

1000. Let me ask you first of all, generally, has the result of those inspections been that your opinion remains unaltered as to the great advantage of placing the gas and water pipes in the subways?—It does.

1001. Do you mention that as an advantage, not only to the public, but to the companies themselves?—Yes, in my opinion.

1002. I believe you have got with you a specimen of the soil taken from near a gas pipe, as laid now in the streets?—I have; these are them (*producing the same*).

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The *Committee* intimated that it was not necessary to go into the question of the contamination of the soil by gas pipes, as that was obvious to every one accustomed to the streets of London.

1003. Mr. *Cripps.*] I think there are some results which depend upon your own observations and opinion, are there not?—If you will allow me, there is one matter which probably ought to be mentioned, and that is as to a sample of earth taken out of the subway in Covent Garden. The pipes in the Covent Garden subway are laid in the earth, and have been there, I believe, for four years; and you will find that that earth is absolutely free from any taint whatever of gas.

1004. *Chairman.*] That is out of the subway?—It is out of the subway; round the pipes laid in the subway; and, therefore, it shows that there is no leakage.

1005. Mr. *Duff.*] Are the pipes being used now?—The pipes are being used now, and they have been used ever since the inquiry of 1864.

1006. Mr. *Jackson.*] Where did you get that earth from?—This was got from the Broadway, Golden-square.

1007. When?—Yesterday.

1008. Mr. *Paull.*] In what year was the pipe laid in the subway?—Prior to the last inquiry by the last Committee, 1864.

1009. Mr. *Jackson.*] Do you know when the pipes were laid in the Broadway? —I do not know, but I should think it extremely likely that the pipes in the Broadway have been there a much longer time than the pipes in the subway in Govent Garden; but there is no beginning of taint in this earth.

1010. Mr. *Cripps.*] You mentioned that you considered there were advantages not only to the public, but to the companies; will you tell the Committee what, in your opinion, are the principal advantages which would result to the companies themselves, from adoping the system of laying their pipes in the subways? —First of all, in my opinion, there will be the facility of laying the pipes, due to the fact that you can get round about them in every part; that the man who is at work is not in a narrow trench, made as narrow as possible to save expense, where he can only stoop with difficulty, but he is in a comparatively large place; then, that all the parts of the joint can be got at; then, that the work being unburied, the man dare not leave it in a slovenly state.

1011. That refers to the laying in the first instance?—Yes.

1012. You think it would be done more perfectly there than it is in the street? —Yes, I think it would; because it can be, and because it must be, inasmuch as it would be detected if it were not properly done.

1013. That is one advantage; will you go on to mention any other, with reference, for instance, to the jointing to be done from time to time?—The question of jointing supposes that there is no ground to open, and that you have any amount of time you require for the purpose of laying the services in; that is another advantage to my mind; another is, that the pipes will not be laying in moist earth, but can be got at to be painted on the outside.

1014. You say laying in moist earth; is there any disadvantage, in your opinion, in that from corrosion?—As far as regards the services; certainly, the wrought-iron services.

1015. That would be prevented, of course?—That would be prevented by the facility of getting to those pipes to paint them; again, there is the decrease of leakage, which would be due to the superior manner in which the pipes would be originally laid, and also to the facility for inspection from time to time; again, another advantage is that there would be no danger of the water being fouled by any escape of gas; another is that meters can be fixed in the passages to the pipes, and the consumption of any person can be checked if there is reason to suppose that it is desirable to check it; to my mind those are all advantages to the companies.

1016. From your observation at the present time, is it frequently the case that the jointing is done in a very hurried manner by the workmen, and not done with sufficient care?—From my own observation, no; but from my own reading, and general knowledge, and my information, yes; I know from my own observation that this is done, namely, the jointing of two pipes together before they are put into the trench, in order to prevent making more joints in the trench than they can help.

1017. That is done in consequence of the difficulty of joining them in a small trench?—

trench?—No doubt; and that is a practice which is prohibited by Act of Parliament.

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1018. They ought not to be joined before they are put down; but they ought to be joined when they are put down; I understand you that in point of fact they are joined before they are put down, owing to that difficulty, and the law is broken in that respect?—Yes.

1019. Mr. *Jackson.*] Are those pipes turned and bored, or leaded?—Sometimes they are turned and bored, but the common practice is to run lead into the joints without the joint having been turned and bored.

1020. In those that came under your observation, were they leaded, or turned and bored?—I believe they were leaded.

1021. Mr. *Cripps.*] Those are advantages more or less to the companies, and to the public through the companies?—Yes.

1022. Are there other advantages which the public derive?—There is that advantage which everyone knows so well, the avoidance of breaking up the streets; and there is another one which is a material advantage, and that is in the greater safety.

1023. You know I have no doubt what has been stated with reference to the great number of pipes which would be required in the subway; does that, in your opinion, present any objection at all to the system?—I believe, in reference to the Southwark-street subway, that the statement has been reduced to three pipes of each kind as the requirement. I do not agree in the necessity for there being more than two pipes of each kind, but if it be the fact that three of each kind are required, the pipes are there.

1024. Now, it also has been objected, as you are aware, that there may be a difficulty of making a junction or joint between the pipes in the subway and the pipes which would not be in the subway?—Yes.

1025. What do you say to that?—In the first place, I say that, as the lateral openings already exist in the subway, it is out of those lateral openings that the services must go; there is no difficulty whatever in providing for these services at the same time that the pipes are originally laid down; but in the second place, I say, from my own experience and observation, that if that be not done, there is no difficulty whatever in putting the service into the pipes; that may be done in one of three ways. I saw it done in that way, which was the most open to risk, if risk there was.

1026. *Chairman.*] What was that?—Using the ordinary drill and tap while the pressure was on the pipe; and it was done while the naked lights were round about at the time, and with a pressure of 18-10ths of gas in the main.

1027. Now, the next; you spoke of three modes; what was the next?—The other way is the plan of bladdering the main, which is well known, and which reduces the escape of gas to a very small amount indeed; the other way is the plan invented by Mr. Upward, one of the engineers of the Chartered Gas Company; that is a mode by which the service can be got in without any difficulty whatever.

Mr. *Cripps.*] That I will not trouble you with, because we are going to call Mr. Upward.

1028. Mr. *Jackson.* Have you ever seen the services put to the mains in the ground when the gas has been on?—I have.

1029. Do you think that there is greater danger in performing that operation in the subways than in the street?—Supposing the services were put in in the subway as carelessly as they have been in the streets, I think there is more danger; but supposing that they were properly put in in the subway, I think there is as little danger.

1030. *Chairman.*] What do you mean by "carelessly?"—Chipping a pipe with a chisel instead of drilling it, and taking no precaution whatever to prevent the gas from escaping while the operation is going on.

1031. Do you mean that they chip a hole in the pipe?—I mean that they chip a hole in the pipe with a cold chisel as nearly round as they can, which, from their great experience, they can do with very considerable accuracy: then they rymer it, and then they tap it, and then they make a screw with the tap; no precaution whatever being taken to prevent the gas from issuing from the hole.

1032. Mr. *Jackson.*] If there is an escape of gas under those circumstances, it goes up into the street?—Yes; it goes up into the street.

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1033. Mr. *Cripps.*] If it were necessary in making the joints and junctions between the subways in the streets and out of the streets, to have bent pipes, should you consider that any objection?—I should not consider it any more objection than any bent pipe that you have out of one street into another: it follows that if you have to make a connection with one pipe in one street to a pipe in another, at right angles, you have to do it by a bend.

1034. You heard what was asked yesterday in cross-examination of one of the witnesses as to the difficulties of getting the pipes into the subways in the first instance?—I do not think that I heard it yesterday, but I think I heard it on a former occasion.

1035. Does it appear to you that that is a well-founded objection?—The pipes are already in the Southwark-street subway, and I believe they were got there without any difficulty, but I think it would be perfectly easy to make any sized opening required for any sized pipe; I suppose there is no difficulty whatever in making a sufficient entry; the water pipes in Paris are in the subways.

1036. Does it appear to you that the laying of the pipe in the subway would be open to the objection of being particularly expensive?—I should certainly have imagined that it would not be so; that it would be cheaper, because there is obviously not the trench to make, nor the paving to be disturbed, nor the ripping up, nor the repaving.

1037. I see among other objections raised, there is the liability of the pipes being stolen; I will not ask you about that; we can judge of that for ourselves; now as to the possible event of a water pipe bursting, what do you say to that?—I think upon the former occasion it was objected that if a water pipe burst then the water would wash the gravel away, and choke up the gratings; that I understand has been provided against by Mr. Bazalgette, who is prepared to meet that by putting the floor in concrete, instead of in gravel.

1038. Those are objections which you think are of a frivolous kind: but are there other objections which appear to you more or less serious, which you are prepared to deal with?—Yes.

1039. Will you mention what those are?—The first of them is the question of the variation of temperature as affecting particularly water-pipes; now the answer to that is, that we were assured when we were in Paris that the temperature was peculiarly uniform; as a matter of fact, the water pipes are there in the subways, and every one is thoroughly satisfied with them: the water pipes have been in in Nottingham for upwards of three years, I believe nearly four years, and they have also been in in Garrick-street, and, as far as I know, without difficulty of any kind; therefore the practice has answered that objection.

1040. Now if you were to go from the practice to any scientific theory about the matter, do you think that the amount of variation of temperature could be such as would affect the pipes?—I have been at the pains to find out what would be the difference of length of a 9-foot pipe, assuming 20 degrees of variation in the temperature, and I find that it would be little more than the two thicknesses of that foolscap paper.

1041. *Chairman.*] Less than the eighth of an inch?—Less than the 80th of an inch.

1042. Mr. *Cripps.*] That will be assuming a variation of what?—It is assuming a variation of 20 degrees of Fahrenheit, and the variation in length would be 1-80th of an inch, or the least bit more than two thicknesses of that paper.

1043. Even supposing so slight a variation as that, and it was desirable to obviate it in any way, could it be obviated?—There is a perfectly well-known way of doing that.

1044. How would it be done?—There is first of all the ordinary stuffing box joint, by which one pipe is allowed to slide to a considerable extent within the other, and then there is what is known as a disc expansion joint, which is now largely used in steam pipes, and where a portion of the pipe is made elastic for the purpose of giving the requisite amount of movement; but I have not the slightest reason to believe that those would be required, judging from the experience I obtained in Paris.

1045. At the same time if required, means could be provided for remedying that?—Yes; there are well known and perfectly practicable modes of doing it.

1046. Now there is an objection on the other side which is a serious one, as to the possible accumulation of gas in the subways from escape by defective joints or defective pipes; have you considered that question?—I have; in the first place I believe that the chance of escape is extremely remote; as far as the subways that have been made have enabled us to judge, I think it is borne out by them—here is an instance of some earth taken from round a pipe which is laid in the subway; the pipes were laid in the subway in the earth, as I think most unnecessarily (*exhibiting some earth in a bottle*), and what is the fact, owing to that pipe not having been disturbed by the traffic or by the disturbance of the road, or any other causes, this earth, which was taken from round about the joint is absolutely free from any taint of gas.

1047. Mr. *Duff.*] Is that taken from the earth round about the Garrick-street pipe?—Yes, from one of the two gas pipes laid in Garrick-street.

1048. Are they now being used for gas?—They are now being used for gas; it is the one which supplies the Garrick Club, which happens to be on that side of the subway; not the service-pipe, but the main from which the service-pipe comes which supplies the Garrick Club.

1049. Mr. *Cripps.*] I understood you to say, that in the first place you thought there was very little escape at all?—I was going on to say, that assuming an escape to take place, there are ventilators provided at every 100 feet, and the gas as it escapes, naturally rises from its being so much lighter than the air; and I believe, that as soon as it reached one of those openings which are at intervals of 100 feet apart, it would make its escape upwards into the road, in the same way as the water would make its escape downwards into the sewer.

1050. Viscount *Galway.*] Do you think that there would be the same effect produced if it were laid in concrete as if it were laid in gravel?—I think, probably, that the concrete would stop any escape whatever, but I certainly should not propose that; I think it would be purchasing that at the loss of the opportunity of inspecting the pipe.

1051. Mr. *Jackson.*] You mean that you would put the pipe on the concrete?—Yes; when I spoke of concrete, I meant the substitution of a concrete floor for a gravel floor, not to bury the pipes in the concrete.

1052. Mr. *Cripps.*] Upon that concrete floor, you would propose to put something to rest the pipe upon?—I should propose to put such brick piers as there are now in the Southwark-street subway; I should propose to put a brick pier common to the three pipes that I believe has been done, and they contain about three cubic feet of brick work to each pier.

1053. Mr. *Jackson.*] Then you would keep the pipe above the floor?—I should keep the pipe above the floor to such an extent as would enable one to get to the under side of the joints.

1054. Mr. *Cripps.*] Do you think that there need necessarily be any serious escape of gas into the sewers when the pipes are being tapped, and communications made in the subways?—No, I have disposed of that, when, considering the mode of putting in the services.

1055. Now, I will take you very shortly through what you have to say about the experiments in Paris; you went over as you told us this year with the other witnesses I believe?—I did.

1056. You heard Mr. Bazalgette and Mr. Hemans' evidence?—I did not hear Mr. Bazalgette's evidence; I only heard a portion of it; I heard Mr. Hemans' evidence entirely.

1057. Mr. Hemans went into the matter very fully, did not he?—Yes.

1058. Do you concur entirely with what Mr. Hemans stated as to the cause of the explosion in Paris, at the Pont d'Austerlitz?—Entirely.

1059. *Chairman.*] You think that the explosion was in the pipe and not in the subway?—It appears so from the reports; the pipe was entirely ripped open.

1060. Mr. *Cripps.*] I would only ask you generally, having examined the causes of that accident, and examined the sewers and subways in Paris, do you think that what has taken place there furnishes any argument whatever against putting pipes in a properly constructed subway?—To my mind, not; what has taken place in Paris is to prove that gas, when mixed with air, is explosive, but not to prove to my mind that it had anything to do with the subways.

1061. I think Mr. Hemans stated in his evidence yesterday that he was not aware of any explosion that had taken place, under the present system, in London?—He did.

1062. Do you yourself know of any explosions which have taken place from gas, by laying the pipes under the present system in the earth?—Yes; of course

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I was not on the spot at the time, but I was consulted about it, and had to investigate it; about a year ago there was an explosion in Oxford-street, at the shop of a tobacconist, named Medex; I had to investigate that matter, and it appeared to have arisen from the gas main having become broken owing to the ground having been opened round about it for other purposes; the gas from that broken main penetrated the soil, it then found its entry into the drain, and then penetrated into the house, and blew up the house, the main being a considerable part of the width of Oxford-street away.

1063. Mr. *Jackson.*] On the other side of the street?—It was beyond the centre of the street, I believe; that is one instance.

1064. *Chairman.*] Do you know of any other?—There was another also which I had to investigate myself thoroughly, and that was on the occasion of that dreadful explosion at Wood-street, which arose from laying in a service. I have heard of explosions, and I have read of 17 instances, which were handed in to the last Committee by Mr. Stevens. Those 17 instances contained numerous explosions and fouling of water, and other injuries arising from gas, where the pipes had been laid in the present mode.

1065. I understand that you have been at Nottingham?—I have.

1066. I think the Committee would like to hear something about that?—I was in Nottingham in 1864, and again in 1866.

1067. Mr. *Cripps.*] Will you state what you know of the state of things at Nottingham?—In 1864 I went and examined those subways, and the gas and water pipes in them, and I heard what had to be said upon them in the town. In 1866 I went into those subways again, and I was told that nothing whatever had occurred to show that it was undesirable to use subways. There was nothing in my own observation to lead me to believe that there was; and then I went into one of the new subways that had been made since, in which there was neither gas nor water pipes.

1068. *Chairman.*] Do you know that the Gas and Water Committees both refused distinctly to use the third one that was made?—Mr. Tarbotton told me so at the time, and I heard Mr. Tarbotton give his evidence the other day.

1069. Mr. *Cripps.*] You went down to Nottingham, and you found that the gas and water pipes which you had seen in 1864 in the subways, were there still, and that they were still used as before?—Yes.

1070. I am told to ask you another question, which, I think, is hardly necessary, about the density of the air. The density of the air in those subways would not in any way keep the gas down, but would rather tend to send it out at the top, would not it?—I should presume so, certainly. If it were not to do so, then you would get into this curious condition of things, that the heavier the fluid below which you had a light fluid, the less likely is that light fluid to come to the surface, which I think, is contrary to all experience.

Cross-examined by Mr. *Burke.*

1071. I think you stated that the chances of explosion are remote from these pipes being laid in subways?—I think so.

1072. But is it possible that they may take place?—It is possible, of course, as almost all things are.

1073. I think one witness has said already that explosions from gas we shall have from time to time, in all probability, either on one or the other plan?—I do not say that he did say so; I do not know whether he said that in relation to subways only.

1074. I will read to you a statement laid before us by Mr. Bazalgette:—"We therefore ventured to think that the eminent Parisian engineers whom we have named have been too hasty in condemning the practice of laying gas pipes in properly constructed subways, and that if carefully laid, well ventilated, and frequently inspected, the gas services might safely be so laid, and that great advantage to the public would ensue from such a practice. The greatest caution and care will always be necessary in dealing with gas whether in or out of subways; explosions will probably never be wholly avoided"?—In the use of gas; I do not suppose that there is anybody who will tell you that we can entirely prevent explosions in the use of gas.

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1075. This is not only Mr. Bazalgette's report, but Mr. Bramwell's also?—Yes.

Mr. *Cripps.*] The report says:—"In dealing with gas, whether in or out of subways, explosions will probably never be wholly avoided."

1076. Mr. *Burke.*] I am dealing with it in subways. If an explosion can occur in a subway, and does occur, although you say that the probability of it may be remote if it occurs in 20 years hence, that explosion would be of a most fearful character, would it not?—No, I do not think it would, and I should like to show you why I do not think it would; I mean of a fearful character, as compared with something else; as compared, for example, with explosions which take place at the present day in the sewers, from gas.

1077. Let us deal with a sewer. In case of the gas percolating through the ground, the escape is of a moderate character, is it not?—Not necessarily; that would be a question of time.

1078. Has there ever been such a thing as the blowing up of a sewer for a long extent, the same as took place in the Pont d'Austerlitz in Paris; has there ever been anything more than a localised explosion confined to a very small space, in the case of a sewer?—I think there are a number of instances given by Mr. Stevens; there is one considerable explosion.

1079. One over a space of 50 years?—Not over a space of 50 years, over 20 years, I believe it is.

1080. Has there been more than one. If you do not know it of your own knowledge, I will not press you upon it; I want to know whether you can give me one extending over a long space, occurring in a sewer, which was anything more than a mere local explosion, arising from an accumulation of gas at that one spot?—From my own knowledge, in a technical sense, I cannot give it you, because it did not happen that I was on the spot at the time; but I know it was a matter of report.

1081. As a matter of hearsay?—Yes.

1082. But do you refer to it as being an explosion of a great character in a sewer covering a large extent?—If you think it worth while to pursue that, I must refer to the book to tell you.

1083. In that case you will refer to another man's evidence?—I say that I was not there when it happened, and I cannot, therefore, speak to it of my own knowledge.

1084. I think you have never had anything to do with gas yourself?—Not as an engineer myself in the way of being engineer to a gas company, but I have had a great deal to do with gas explosions.

1085. But you have never been engaged as a gas engineer?—No.

1086. The remoteness or non-remoteness of an explosion will depend, of course, upon the care with which the pipes are laid?—That would be one of the elements.

1087. And the maintenance?—Yes.

1088. There being necessarily, as you must admit, constant interference with the services by the change of tenants, the cutting off of gas, and the laying on of gas, there must be frequent interference by the workmen with the pipes in the subways?—That is so; but I think you are putting it much higher than the facts warrant. I do not think it would be so frequent as you suggest.

1089. I asked you particularly whether you had been engineer to a gas company, to see what your experience was. Do not you know that every gas company, every day of its existence, is sending its men to alter services, to lay on services, and to cut off services for non-payment of rates; that those are daily operations?—Yes.

1090. If that takes place now in the streets, it must take place hereafter in the subways?—No, that is where I differ from you.

1091. Let us take a case in which the company wants to cut off the service for non-payment of gas rental, which is a thing that occurs every day. Do not you know that it is a very common thing for the gas companies to send a man with a pickaxe to say if you do not pay the rent we cannot supply you any longer with gas; that is occurring in hundreds of cases daily; must they not come into the subway, and cut off the gas?—No.

1092. How are they do it?—There are two ways in which it might be done. One is that it might be cut off within the premises of the tenant; and the other is,

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is, that if the gas were laid in as I should propose it to be laid in, namely, by putting a cock into the service, the man would simply go down into the subway and shut the cock off.

1093. Then you would have a constant series of cocks throughout the whole of the subway, attached to each house?—I should; I mean the cocks that are for the services only.

1094. Of course, every one of those cocks must fit tight, in order to prevent the possibility of escape?—Yes, it would be quite sufficient if they were as tight as gas cocks ordinarily are.

1095. Now, we come to the question of the necessity of constant care; if a careless workman were to leave those cocks half turned, there would be an escape of gas at once, would not there?—Do you mean when the service is connected, or when it is not.

1096. Take it disconnected first; in sending in a man, supposing instead of cutting it off altogether he did not turn it off properly, what would be the result in that case?—That the non-paying tenant would still get his gas.

1097. Supposing the house was empty?—Then the empty house would still get the gas.

1098. There would be a constant percolation of gas into the house going on?—If they had left all the services in the house open.

1099. Then all the cocks must be hermetically sealed, to prevent the possibility of any gas escaping?—I do not know what you mean by hermetically sealed cocks.

1100. Every joint connected with the cock, attached to the pipe through which the gas is passing, must be so tight that there is no possibility of escape?—I am afraid you do not understand the construction of a gas cock.

1101. I know what a gas cock is; it is a thing turned round, to let the gas in or to shut it off, and the joint must be so hermetically tight, that no gas can escape from it, and you must have one attached to every house?—It must be as tight as they ordinarily are, which is sufficient for ordinary purposes of dwellings in which people are from day to day, and no tighter; that would be an ordinary cock.

1102. Now, let me take you to a case which may possibly be an exaggerated case, namely, of wilful damage to a pipe; supposing the case of a London row, any *emeute* in London, and that any ill-disposed persons got into the subway, and wilfully let out the gas, would not the result of that possibly be, that the whole street must be blown up?—It is a very extreme case.

1103. I admit it is a very extreme case; but you are to give the means which suggest it. You are going, as it were, to lay a train of gunpowder in every street. I admit that it is an extreme case, but we know that the roughs of London do extreme things. Now, the roughs of London, having a train of gunpowder laid or capable of being fired through the whole street, would not they have an opportunity of blowing up the whole street, if you had these subways?—They would have the opportunity, supposing there were found a man bold enough to go in and make such a leakage as would do the harm which you suggest.

1104. You say "bold enough"?—A sort of gas Guy Fawkes is what you want.

1105. We have recently read of the operations of a gentleman of the name of Broadhead, who has been having places blown up by laying trains. I put that case. Is it not possible that an ill-disposed mob might do such a thing to a whole street in London if there were put there the ready means of doing it?—No, not the ready means.

1106. The mere access by the man-hole into the subways and the breaking of a pipe would produce that result?—Yes, if there were found a man bold enough to do it.

1107. There is a train of gunpowder if there is a man bold enough to do it?—I think Mr. Broadhead would be inclined to revert to the old sewers for the purpose of laying barrels of gunpowder in them.

1108. Of course the sufficiency of the ventilation would depend upon the rapidity with which the accumulation takes place?—The rapidity of the accumulation would depend upon the ventilation.

1109. I will take the converse, if you like?—I will take it your way.

1110. So that if a pipe gave way and came down, so as to let a great volume of gas out, or if in the suppositious case I have put to you, a voluntary fracture of the pipe took place, the gas would go out in a greater volume than could possibly escape by your ventilator, would it not?—No.

1111. You think not?—No.

1112. It could be cleared at once, you think?—No; not cleared at once, for this reason; there is a ventilator at every 100 feet; the ventilators are two feet in diameter, less the grating; I believe the gas would rise to the roof, and would run along the roof until it had found a sufficient number of those ventilators through which it could escape.

1113. Although the gas came out in a great volume from the large main, you think that all that gas would, as fast as it came out, get into the open air?—There are a certain number of ventilators; the pipe is a certain size, and the ventilator is a certain size, and I can compare those two areas in relation to each other.

1114. Then you do not think that there would be any accumulation, under any circumstances, in the subway?—I have not said so; I say the accumulation would be limited to a small part of the subway, and that the ventilation would be sufficient to take out the gas through the ventilating openings.

1115. If there is an accumulation at all mixed with the atmospheric air, it becomes an explosive mixture?—Yes, in certain proportions, no doubt highly explosive.

1116. You see nothing to fear from people going down to mend the pipes from time to time?—I do not.

1117. You do not concur with the evidence given by Mr. Bazalgette on the last occasion, as to going down in a diving bell to do that?—I do not know what Mr. Bazalgette's evidence then was. I came into the room and saw a drawing of a diving bell, as you call it, but I believe that that was a piece of Mr. Bazalgette's invention suggested to meet some extreme case.

1118. It was an invention, in point of fact, to obviate in the subways obvious danger?—No, I think not; I think it was in answer to some such supposition as a man going down to blow up London.

1119. You heard of the explosion at Wood-street?—Yes.

1120. Was not that an explosion arising from the main being open, and from the carelessness of the workmen?—Yes, it was.

1121. And I believe the company was mulcted in damages to the extent of something like 25,000 *l.* through the carelessness of the workmen?—The carelessness of two workmen.

1122. These very workmen, to be employed in the subways, are never to be careless; they are always to observe excessive care; that is to be secured?—No; I put it to you in this way, that when the men are laying a pipe in the open trench, the necessity for care has not been so strongly impressed upon their minds, as it would be in laying it in a subway.

1123. The danger of explosion in a subway being greater, you think the workmen employed would be more careful in the subway than they would be outside; is that your view?—That is to say, the man would be told this, "Whereas you have been allowed to chip holes in mains for the purpose of laying services in open trenches, now that slovenly conduct shall not be pursued with the gas pipes in the subway."

1124. Though you have not been a gas engineer, you have had, I presume, to do with workmen?—Yes.

1125. Do you always find that the instructions to them secure perfect care?—No.

1126. Therefore, if those instructions were not followed, if they were careless, a street might be blown up by them?—There might be a portion of a street blown up.

Re-examined by Mr. *Cripps.*

1127. My learned friend read to you from Mr. Bazalgette's report: he says, explosions in subways cannot always necessarily be avoided; I wish to ask you this: in your opinion, would laying these pipes in these subways reduce the probability of these explosions to a minimum?—Yes, I believe it would.

1128. As compared with the present system?—I believe it would; this very accident

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accident in Wood-street, I am perfectly certain, would never have happened if the pipes had been in the subway; I can give the whole details of that if the Committee wish.

1129. Without giving more details, it is clear to us all that this accident which happened by the present system was a very serious accident?—Yes.

1130. As my learned friend says, the company had to pay 25,000 *l.*?—Yes.

1131. You think that such an accident would not have occurred if the pipes had been laid in the subway?—I believe it would have been absolutely impossible, knowing the details of it fully as I do.

1132. My learned friend ought to know something about gas, but he surprised me by the question; he asked—"Turning off gas by means of a cock is one of the commonest possible operations, is not it"?—Yes; it is done every time that the gas is either lighted or put out.

1133. What you propose would be, that if it was necessary to cut off the gas instead of sending these workmen about with a pickaxe to grub up the streets in London, you would merely send a man into the subways to turn off the cock, or to change the service?—Yes.

1134. That would be the change?—Yes; nothing has been said about the cost of the cocks, but anyone in the room who has got a list of the cost of gas pipes would find that there are various cocks, and that it would only amount to a few shillings.

1135. I believe, at the present time, if you want to cut off a man's gas pipe, you are obliged to damage it in order to prevent him from turning it on again, if it is in his premises?—The proper thing to do would be to put a cap on, and screw it down, and that was an answer I did not give; the suggession was, that supposing the cock got open, presuming that the service had been disconnected; the answer to that is, that the instant the man disconnected the service, it would be his duty to screw a cap upon the end of the pipe, and then anyone might come and open the taps in the house as often as they liked, and no harm would ensue.

1136. It will be a great convenience to be able to effect that in the subway, so that the party in the house would not be subjected to the operation of disconnecting the pipe at all?—You have got the pipe under your control; you go and shut the cock off and stop the gas in the same way as is done with the water services.

1137. With reference to the mob in London, they might put gunpowder in the subways or sewers, at present?—It seems so.

1138. Mr. *Paull.*] I presume that under the best of circumstances the pipes cannot be laid so securely as entirely to avoid escapes of gas?—I am inclined to think that they can.

1139. The mains that would be?—Yes; would you allow me to show that. I have here a little water-gauge, and I want to point out to you that my reason for saying so is, that the pressure which one has to deal with is extremely small, it is not any more than I can exert with my breath. At the present time there is no pressure on either side of that gauge (*exhibiting the same*). These two coloured spaces are level. You perceive, now that I have breathed into this, that there is about six inches difference, which is a greater pressure than you get in the mains in London; two inches is a very common pressure in a main; that is all the pressure with which you have got to contend.

1140. Has that anything to do with the question I was asking you?—It appears so to me, that is to say, that is the reason why I think you might lay a pipe so as to have no leakage whatever; that is only about one-third of the pressure which a healthy man would give by his breath.

1141. *Chairman.*] Do you mean breathing naturally?—Yes.

1142. Not blowing into it?—No.

1143. Mr. *Paull.*] Are we to suppose that when escapes of gas take place either in the mains or in the services, that it results from the pressure?—In a sense, yes; because, if there were no pressure it would not get out; but the escape results also from there being a place where it can get out.

1144. But, of course, if a leakage takes place, if the pressure is great, more gas will come out; and if the pressure is slight, less gas will come out?—Yes.

1145. But the question that I put to you had nothing to do with pressure; it was a question whether gas pipes, mains, or services can be laid so securely as to avoid escapes of gas altogether?—I think so.

1146. Viscount *Galway.*] There must be some pressure?—There is the pressure which I show you of two inches.

1147. Mr. *Paull.*] Is it not true, supposing even the joints to be always made perfectly secure, that the metal itself is porous and admits of an escape of gas?—I very much doubt, indeed, the truth of that theory.

1148. Supposing what you state to be quite accurate, that pipes can be laid, both mains and services, perfectly secure, so as to avoid all escape of gas, what would you say to the services and the cocks. I presume that the workmen may sometimes leave the cocks turned so as to admit of an escape; that, practically, the thing occurs every day?—I do not follow you; the cocks that I suggest are cocks that are in the services; therefore, if those cocks are left turned, the escape is into the service and not into the subway. If it is a cock to which no service is attached then a cap ought to be screwed on at the end of it.

1149. Then I may take it, that under no circumstances whatever, either from leakage or defective pipes, or from negligence in not turning off the cocks, any escape whatever will occur?—No, you are not to take it so.

1150. That is what you say?—I beg your pardon; you asked me whether in my judgment it was practicable so to make a joint that there should be no escape whatever. I said that I believed it was; but if you ask me what I believe the result would be, I think that the result would be a leakage here and there, a small leakage of gas; extremely small, because I know it is possible; I have seen it tested; to make a joint which is perfect, to begin with, and I know of no cause in the subway to disturb that joint where properly made.

1151. Viscount *Galway.*] Do you happen to know whether that gravel in that bottle was taken at the joint of the service pipe with the main pipe?—It was taken at the joint of one main pipe with another; I took it from that portion for the very object of trying to ascertain if there was any escape at all, because, if there was, that would be the point where the escape would be.

1152. Mr. *Paull.*] I was going to say, supposing you to be quite accurate in that, still though it is reduced to a minimum, an escape may take place?—Yes.

1153. In your judgment, which is the safer to the public, that the pipe whence the escape may take place should be sunk in a material that will absorb the gas, or that it should remain in an open place where the gas will circulate with the atmospheric air, and be subject to explosion?—If it be a material which will absorb the gas, then a main laid in a subway as compared with a main being laid in the earth in the ordinary way, is, in my judgment, the safer.

1154. Where the pipe is entirely free from all material around it?—Yes.

1155. Then it is not a desirable thing that the pipe should be enclosed in a material which, like the earth, will absorb the gas?—I do not agree with you that the earth does absorb the gas; that is to say, not indefinitely, because I know as a matter of fact that pipes which are laid in the earth, after the earth has done all that it can in the way of absorption, if it can do it all, are still the source from which gas gets into other places, therefore showing that the absorption has got an end to it.

1156. No doubt, but still as a rule leakages would occur in earth which was not so overcharged as not to be able to hold any more?—As far as my experience goes from the openings made in the streets of London, I should think they were pretty well saturated; they seem to be pretty well up to the hilt.

1157. Speaking on behalf of the public, you stated to the Committee that you consider greater safety would be obtained by placing the gas pipes in the subways than by leaving them sunk in the earth?—Yes, I do most certainly. I believe if you take those various instances given by Mr. Stevens of accidents from explosions which have taken place from gas pipes in the earth, had those gas pipes been in the subways, the damages arising therefrom would have been very much less.

1158. You speak of Nottingham, would you personally have liked to have joined in the indemnity that the Corporation proposes to give to the gas company there when they objected to go into the subway?—Yes, personally.

1159. *Chairman.*] You would have had no objection?—I should have had no hesitation whatever, supposing there was any reason why I should have joined in such

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such an indemnity, had I been either the engineer or a member of the Corporation, supposing it were my duty to do so.

1160. Mr. *Paull.*] I mean your confidence?—If you are testing my opinion by the effect upon my purse, I say yes.

1161. Your confidence as to the minimum of danger was so decisive?—Yes; may I put it to you in this way; if I had to insure people from accident by gas, I would insure at a much less premium, if the gas was put in a subway than if it was put in the streets, supposing I had to insure against all kinds of accidents.

1162. Viscount *Galway.*] I suppose an escape of gas would be readily detected in a subway?—Yes; you will find in the particulars put in by Mr. Stevens, that there was a 3-inch main which was broken for a long time, and was not discovered; I do not say that those are quite the actual words in the report, but that is the effect.

1163. Mr. *Jackson.*] Have you found, from your experience, that it is necessary to use a very great pressure where a low district has to be supplied with gas?—The pressure has to be increased, to compensate for the low level at which the gas is.

1164. Have you found from your experience that, notwithstanding the pipes are as perfect as they well can be, those pipes are more or less leaky in proportion as you get under a stronger pressure, not at the joints, but in the pores?—I have not; I know it is the popular opinion.

1165. Are you not of opinion also that it is necessary to put gas pipes on one side and water pipes on the other, in order that the water may not be polluted?—Quite so; I think it is a very proper precaution, so long as both pipes are laid in the earth, because I believe, as the gas pipes are laid, they undoubtedly leak, as is shown by this; and I believe that, owing to that leakage, the earth gets saturated with the flavour of the gas, and then, if you have got a leaky joint to a water pipe, the flavour of the gas gets communicated to the water; but I think if the two pipes were in the open air the transmission of the flavour of the one to the other, would be very much less; I will give you the illustration as to whether you would rather be alongside an extremely dirty and diseased man in the open air, or whether you would prefer to get into the same bath with him.

1166. Do you think that the ventilation so proposed, in the subways, would carry away any small leakage of gas, so as to prevent the communication of the gas to the water pipes?—I do; the gas and the water are very nearly on the same level, and I do not believe that you would get the atmosphere in the subway in the state of stench in which this earth is.

1167. Supposing there was an accumulation of gas, if you had, in addition to the ventilating shaft, a warmed shaft, would that accelerate the gas being carried away?—It would.

1168. If you warm the shaft in the same way as the shaft in a coal pit is warmed, supposing that ventilating shaft was open at the end of the subway, so as to accelerate the current of atmospheric air if that shaft was kept warm, have you any doubt whatever that the leakage of gas might be and would be carried away?—I would rather not do that; I would rather not localise the draught; I would rather have it carried out by the separate openings,

1169. Mr. *Floyer.*] Do you happen to know whether any leakage occurred during the time of the pipes being laid in Garrick-street requiring the repair of the mains and pipes through which the gas passes?—I do not know; the only thing which I know of leakage is from a test of the earth; I believe it will be found to be the case, that since we were there in 1864, services have been put into the mains which were not there then, owing to the buildings having been made since; I am not sure of it, but I believe it will be found to be so.

1170. My question referred more to the fact of whether the pipes laid in the subways did not frequently require separation on account of the leakage?—The only answer I can give to that is, that here I find there has been no leakage in the neighbourhood of the joint; the earth smells as pure as earth generally does.

1171. *Chairman.*] Is it near the Garrick Club?—A little to the west of the Garrick Club, I think this was taken.

1172. Mr. *Duff.*] Do you happen to know what companies at present use the subway

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subway in Garrick-street ?—I do not know, but it is stated in the last Blue Book; I believe it is the New River and the Equitable Gas Company.

1173. They were not compelled to go into the subway, were they ?—I believe not; there is no compulsion.

1174. I want to know why they are petitioning against the plan being now adopted ?—I can only judge from the evidence given on the last occasion.

1175. Mr. *Bagwell*.] Supposing that any persons stopped the ventilators that come out in the street, which might be accessible to the public, and the gas were let out into the subway, would there be sufficient atmospheric air in the subway itself to make the gas highly explosive ?—Yes; you begin with the subway full of air; if you do not allow a continuance of the escape of gas to go on too long, of course there will be a particular point at which you reach a highly explosive compound.

1176. Supposing you left it for a time, how soon would it cease to be explosive ?—I am speaking now from memory, but my recollection is, that so soon as the gas becomes a fourth part of the air, the possibility of explosion ceases; I am speaking now from memory; I have made experiments of every proportion from five per cent. to 95 of air; about 10 per cent. is the maximum of explosiveness; if it amounts to 20 per cent. an explosion no longer will take place; I say that with some hesitation.

1177. *Chairman*.] You have said, that in Paris the water pipes are universally in subways or sewers ?—Wherever I went below ground the water pipes were there; and from M. Belgrand's statement and proof, which he had prepared for the last Committee, I find, and he has said in my hearing, and I have reason to believe, that they are universally there.

1178. With regard to water, supposing water pipes were authorised to be put into these subways, as was suggested in the Committee of 1864, in your judgment, do you imagine any possible danger could take place; if a water pipe were to burst, supposing it were a 3-foot main, what would become of the water, the sewer being underneath the subway ?—The sewer being underneath it, the water would simply run into the sewer so long as it was allowed to continue to run.

1179. That would be a good, rather than an evil, would it not, so far as regards the flushing of the sewer ?—Yes; but then the loss of so large an amount of water as that would be at once known at the pumping station, and the flow would be stopped; besides which, there are certain self-acting arrangements which have been introduced at Liverpool, so that if a pipe bursts, it stops itself.

1180. Do you imagine that it is possible that the bursting of a large pipe in one of those subways could do any great amount of damage to the adjoining houses; can you imagine that the rush of water would do any more harm than getting into the coal cellars, or anything of that sort. I want you, as a civil engineer, to bring your mind to that point, which is this: if a great water main burst in the subway, what would be the effect, what evil consequences would follow ?—I believe none to any of the adjoining houses, and I believe so for two reasons; in the first place there are communications to be made with the sewers, where the water would go in large quantities.

1181. That is there; you mean there is such a communication with the sewer ?—There has been, but I think it has been taken out for the purpose of alteration in consequence of some evidence about the gravel.

1182. That is to improve it ?—To improve it; the water would find its way into the sewer. In the second place, I believe you would find that it would take 65 minutes for 10,000 gallons a minute coming out to put a yard deep of water into the Southwark-street subway.

1183. It would, in fact, take an hour ?—Yes; to put a yard deep of water. Supposing that none got out, and that there were 10,000 gallons a minute coming in, I think you would find that it would take an hour to get it a yard deep for the length of that subway.

1184. In what subway is that ?—In the Southwark-street subway; taking the size of that subway, and calling it a cistern, that you are filling at the rate of 10,000 gallons a minute.

1185. Mr. *Jackson*.] Supposing it were going down at the rate of 10,000 gallons a minute, how long would it be before they felt that rapid exhaustion at the

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the pumping engine?—It would be felt almost at once, by the loss of pressure.

1186. Instantly the gauge would tell?—Yes; and the behaviour of the pumping engine also.

1187. She would soon show it?—Yes.

1188. *Chairman.*] Therefore you imagine, I apprehend, that without reference to any pressure of gas, putting water mains into subways could not lead to any inconvenience in your judgment as an engineer?—It would not in my judgment.

1189. Mr. *Paull.*] Did you see M. Belgrand in Paris?—Yes.

1190. This question was put to him in 1864. "What would you think of the proposal of putting gas pipes into a subway," and his answer was this:—"I am quite convinced that it is dangerous; and, moreover, my predecessors and 13 engineers who were in my employment entertain the same opinion." Now, in your conversation with M. Belgrand, had you any reason to believe that the engineers of Paris have changed their opinion with regard to that subject?—No, not at all; I believe that the Parisian engineers, while highly approving of putting water pipes in subways are timid about putting gas pipes in subways; but, at the same time, I believe that that opinion is not based upon any experience they have had, but it is simply based upon the fact that they know gas to be a highly explosive substance.

1191. Have they not had experience?—Not in my opinion. I may be wrong; I should be glad to have my attention called to it.

1192. Because M. Belgrand says that in 1821 a conduit of 750 metres was placed in the Gallery Des Martyrs, and that it was taken up in the year 1832 at the demand of the inhabitants. And then another question comes, and he answers this, "Yes, in consequence of the demands of the inhabitants who complained of the effects thereof, and the consequence of certain explosions"?—That is a matter of 35 years ago, and I think you will find that that is a solitary one, as far as I know; that is upwards of 35 years ago; of which they can give no details whatever, and I should say that the management of gas 35 years ago in Paris was certainly very ill understood.

1193. Mr. *Jackson.*] Was it the practice in Paris at that time to put earthenware pipes instead of iron mains?—I cannot tell that; but it is the practice in Paris at the present day that the internal fittings of the houses, instead of being secret fittings, as they are in England, are exposed; for instance, if they had a gas chandelier here the pipe would be between the floor and the ceiling, but there they would compel you to place the pipeage visibly under the ceiling.

1194. *Chairman.*] You heard the system described yesterday of the French gas mains, and I presume you think, as an engineer, that that is very inferior to our mode of dealing with them?—The mains in the Pont d'Austerlitz, that caused that very severe leakage which Monsieur Belgrand spoke of when he was here in 1864, which was erroneously put down as an explosion, was joined, in my mind, by an extremely improper arrangement, namely, by vulcanised bands of india-rubber; that gave rise to very severe leakage, which appears to have continued from March 1864 until the end of the year, before steps were taken to remedy it; then they replaced it by thin iron pipes covered with bitumen, of which they are so fond in Paris.

1195. Viscount *Galway.*] How do you account for the French engineers being so behindhand with reference to laying gas pipes and joining pipes?—I will not say that they are behindhand, but I will say that in the case of Monsieur Despardo's late experiments, I was greatly surprised that he should have tried to use this kind of bitumenised pipe; I suppose they have used them from their inferior cost, as compared with cast iron.

1196. Do you know how the water is supplied in the Bois de Bologne, in Paris, where there is a great deal used for watering the roads?—The nature of the pipes I do not, but I saw it running there very copiously.

1197. It is used so very much?—The nature of the service I do not know.

1198. Mr. *Jackson.*] It is supplied from the Seine direct, I believe?—I only know that I asked the other day, when I was there, and saw the cascade, and the large amount of water falling there, how it was, and they told me that it came from an artesian well.

[The Witness withdrew.

Mr. *William Allen Boulnois*, called; Examined by Mr. *Wilkinson*.

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1199. I BELIEVE you are an Architect of 20 years' experience?—Yes.

1200. A Fellow of the Institute of British Architects?—Yes.

1201. I believe your attention has been specially directed to the question of laying gas and water mains in subways?—Yes.

1202. And, independently of your general experience as an architect, have you had some acquaintance with the system of supplying gas and water in Paris?—I have.

1203. Under these circumstances, you were requested by the Board of Works to be one of the gentlemen deputed to visit Paris, and to put themselves in communication with Monsieur Belgrand, and to prepare a report?—Yes.

1204. The report which has been read and put in evidence is the report which you have signed?—Yes; it is.

1205. Have you made yourself acquainted with it, if you did not hear it entirely, the evidence given by Mr. Bazalgette, and by Mr. Hemans, and do you concur with all the observations made by those witnesses upon the report?—Certainly, with reference to the report; it is a joint report, and I concur in every word of it.

1206. Just let me ask you one question; the Honourable Member put to the last witness some questions as to his communications, personally, with Monsieur Belgrand; you also were in communication with Monsieur Belgrand personally, and in their presence?—I was.

1207. Do you corroborate what fell from the last witness as to those communications?—I do.

1208. Independently of your investigations which resulted in that report, I believe you are in a position to give the Committee some information upon the subject?—In the course of the inquiries which I had to make into this question, I have had to consider the evidence which was given upon the last occasion, and the objections which were raised by the various witnesses to the introduction of gas and water into subways, and my convictions have been arrived at by a careful study and information step by step, and I have come to the conclusion that both for water and for gas pipes, it would be a very desirable thing, not only for the public, but for the companies themselves.

1209. Let me ask you a few short questions, first as to water: you are aware that in Paris general consent has been given to the introduction of water into the subways?—Yes.

1210. And you yourself also heard the engineers express their strong approbation of that cause in Paris?—I did.

1211. Tell me upon the subject of the water pipes, first of all, would there be an advantage in avoiding certain special damages which occur under the present system; first of all, particularly the washing away of the earth from the other pipes?—Certainly, that is one of the frequent courses of leakage of gas pipes.

1212. Causing a settlement possibly under a well-constructed pavement, and also under the foundation of the houses?—Yes; there have been occasions in which the bursting of the water pipes has washed down walls, and has caused serious damage to the houses.

1213. Is it within your knowledge that the actual fall of houses has been occasioned by that?—Within my personal knowledge it has not, because I was not employed, but I can refer to the circumstances.

1214. Have you heard the evidence given as to the case with which the pipes can be repaired, and the examination of the pipes from time to time made in the subways, and do you concur in that without going into detail?—In every word.

1215. Do you concur also in the opinion which has been expressed, that the services are the most frequent cause of the leakage?—Yes.

1216. Do you concur also in what has been said in regard to the saving to the water companies themselves?—Certainly.

1217. I am now upon the subject of whether you think there would be a saving to the water companies?—Yes.

1218. Now, as to the freezing of the water in the subways; we have had some evidence; what is your opinion as to that?—That it is not possible that the pipes in the subways, such as I have seen constructed here, or in any subway that should be 18 inches from the surface, would ever freeze.

1219. Then upon the question of bursting the water pipes, and damage resulting therefrom in subways, you heard the answers given by Mr. Bramwell to the Honourable Chairman upon that point; do you concur in those answers?—I do; and I go so far as to say, that even if by possibility the gullies to the sewer underneath were stopped up, the simple rising of the water in the subways, and the rising of the water in the adjacent cellars, would be no more than has happened 50 or 100 times in the construction of the sewers before the main drainage was carried out, and that no real damage which can for a moment be put against the advantage on the other side would occur to the houses.

1220. Turning to the subject of the gas pipes, do you confirm the evidence as to the objections still existing upon the part of the engineers in Paris to their introducing gas pipes into the subways?—I do.

1221. Can you state any reason which influences them?—My opinion is that there is a prejudged opinion upon this question upon the part of the municipal engineers in Paris; the municipal engineers are a body which has a strong *esprit du corps*. As thinks their chief, so think they; and my impression is, that this matter has never been discussed in Paris in a serious way as it is here; that if it had been, they would have changed their opinions.

1222. *Chairman.*] Do you know of any French engineers who differ with them?—I do not; but our object over there was special, and we saw only the municipal engineers.

1223. Mr. *Wilkinson.*] Do you confirm the evidence given by your colleagues as to one principal objection being made by the Paris engineers to the system of careless jointing?—I do.

1224. What is your opinion as to the system of jointing used in Paris now?—That is even worse than our own, and that our own is very nearly as bad as it can be; my opinion is that the gas companies have never attempted to introduce any sort of really efficient joints, or pipes, such as would be required were the companies under inspection, because it is comparatively useless to do so; directly they have put down the very best system in the streets, the water companies come and open the streets, and the plumbers or the gas fitters employed by the local person gets the inspector of the gas company to see him open the trench, and he employs careless people. The fact of the trench being constructed and filled in with loose ground, and the traffic immediately passing over it, is very likely to cause a settlement in the pipes, and the leakage, and the gas companies, from the circumstances that it is useless to put in good work, have been in the habit of putting in very bad work.

1225. In consequence of the comparative inutility of putting in work of a better character?—Yes.

1226. From their liability to disturbance?—Yes.

1227. With regard to testing pipes, do you attribute any importance to the fact of the pipes not being sufficiently tested before they are put down?—I think there the same remark would hold good; I do not think that the companies have been sufficiently attentive with regard to testing their pipes, and we hear that they break the Act of Parliament in putting joints to pipes on the surface, instead of when they are absolutely in the trench.

1228. You mean the clause in the Act of 1847, which forbids them to be put in trenches, except in a single piece?—Yes.

1229. Of course any damage done to a pipe in the street, unless it were a serious fracture, would not be detected?—It is hidden up immediately by the workmen.

1230. With regard to contamination; do you concur in what has been said upon that subject?—Every word.

1231. Do you confirm what has been stated with regard to the explosions in Paris, that with the exception of two, all arose from pipes laid in the earth outside the sewers?—Just so.

1232. *Chairman.*] You concur generally in the evidence which has been given; have you anything to add to that?—With reference to the explosions in Paris, I have nothing to add, with the exception that the one we inquired into at the Rue des Martyrs, and from the evidence which we are able to collect, which, of course, was hearsay of long standing. It must have originated outside, and not within

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within the subway itself, because it was said that the wall of the house was shattered, and that the first floor windows were taken out. Now, there are sideways to that sewer in the subway in the Rue des Martyrs, like the side passages here, and from hearsay we could collect, it was in one of the side passages that it blew up, and not in the sewer itself.

1233. Mr. *Wilkinson.*] Then as the general result of your investigation, which system do you think is attended with the least danger; the ordinary system now in use, or that of laying pipes in the subways?—I should say that the pipes would be more accurately laid, and greater care would be taken when they can be examined and inspected as they should be if laid in the subway; that they can be continually examined when once they are there, and that upon the occurrence of a leakage or a breakage, or any accident whatever, the detection would be immediate, and the cure instant, comparatively.

1234. I gather from you that you think there would be less danger in the subways than on the ground?—Certainly.

1235. One question with reference to the operations of laying on the services and so forth, contrasting the present system with that proposed by laying pipes in the subway, what objections strike you?—I think it would be to the interest of the companies themselves, to lay their mains with their nozzles, or attachments for services complete.

1236. With reference to turning off the services?—If cocks were put in, which of course would be desirable, there could not be an objection; there would be no great danger with them, but supposing cocks were not introduced at all, the same sort of mode would be adopted for cutting off the gas in the sideways and subways very much better than it is now, by cutting a trench, and hammering the lead pipe together as it is now done by the water companies, or by breaking off the services and putting in a wooden plug, as is done by the gas companies; such remedies as those would not be permitted, and would be detected.

1237. So far as the danger of explosion is concerned, would there, in your judgment, be more danger from turning off the service pipes, and introducing a plug, than exists under the present mode of turning off the service plug?—The present mode is very much more dangerous than the mode which would be adopted in the subways.

1238. One word only with regard to the possibility of explosions taking place under some very more than ordinary circumstances in the subways; will you give the Committee your idea of the extent of damage that would result from that explosion?—My opinion is, that if an explosion occurred in the Southwark-street or Garrick-street subway, the only result would be the disruption, and not the destruction of the arch, and the displacement of some of the brickwork. I am justified in that opinion by the fact that it is not uncommon, and has not been uncommon for explosions to occur in the sewers in London, and in Paris, arising from the defective gas pipes and leakage which has permeated the soil and got into the sewers, and remain there for a long time until some accidental light is brought, and an explosion occurs; when that has occurred none of the frightful calamities which have been pictured has arisen; the sewer has broken up, and of course anybody inside the sewer has suffered, but there has been no blowing up of houses, and no blowing up of streets.

1239. The damage has been confined to the disruption of the sewer, and the displacement of the brickwork in the immediate neighbourhood?—Just so.

1240. One word further with reference to ventilation; have you not inspected both the Southwark and Garrick-street subways?—I have.

1241. Do you consider that the ventilation is sufficient?—I do; I should say that the eastern end of Southwark-street subway is thoroughly ventilated, and the whole of the Garrack-street subway.

1242. If more ventilation were required, would there, in your judgment, be any difficulty in obtaining it?—None whatever.

Cross-examined by Mr. *Clerk.*

1243. You speak of this scheme as one which would be desirable for the companies as well as for the public; the advantage, if any, to the companies would be one, I presume, of economy to them, economy in making, and economy in gas?—I think so.

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1244. In order to ascertain the economy in working, I understand you to say that there would be less cost in the first laying of the pipes?—No; I do not say that.

1245. You do not say that?—No.

1246. Have you any materials at all which would guide you to the opinion as to whether it would be more expensive or less expensive to the companies to lay the pipes in the first instance?—Only the estimate I have formed.

1247. Do you know what it costs for any given length, say 100 yards of 30-inch main, either gas or water to be laid?—I do; but I have not got it with me.

1248. The instances are few of work done in subways, but do you happen to know what it actually cost the Equitable Gas Company and the New River Company to lay those small pipes in the Garrick-street subway?—I do not know what it cost, but I am quite certain that it ought to have cost them a great deal less than to lay them in the trenches.

1249. Would you be surprised to hear that it cost more?—I should, and I should say that it was intentionally done, if I were told so.

1250. I believe you were never professionally engaged yourself in laying either gas or water mains?—I have laid mains both of gas and water with the assistance of the inspectors of the different companies. We have a gas main and also a water main in the place I am concerned with.

1251. What is the place you are concerned with?—The Baker-street Bazaar, where we have had gas for the cattle show, and water for the different services for a great many years.

1252. But you have not had the construction of that personally to do?—No, but I am an architect, and I personally superintended it.

1253. You say that the freezing of a water main is not possible in one of these subways?—I should say so.

1254. Do I understand you to say that, from what you have seen here in London?—Yes, and also in Paris.

1255. What experience have you had of the impossibility of a main freezing from what you have seen in London?—I judge from the smaller pipes, because the smaller pipes which are in the houses do not freeze, except where they cross the areas, and then there is the slight protection which is afforded by the vault or the coal cellar; it is only in the areas outside the house that they freeze, and where they leave the inside of the house to get to the outside to join the cistern, those are the only points at which they are found to freeze, and I contend that if the protection which is afforded to them by the ordinary vaults of the houses is enough to prevent their freezing, they will not freeze in the subways.

1256. The suggestion here is that there is to be a sufficient ventilation to change the air, and to carry off any possible escape of gas from the mains?—Yes.

1257. We are dealing not with the vault of a house, but with the hypothesis of these subways to be ventilated by a current of air. Will not that in frosty weather introduce a very cold draught down into those subways?—I dare say just at the entrance where the air goes in, it would be cold; if one puts one's hand to it one would feel the difference, but when it got a slight way into the subway, it would be warmer; at any rate it would never go down to freezing point.

1258. If that is the case, I presume there would not be much ventilation, if it is cold at the entrance, and it is not much changed when you get beyond?—You cannot argue as to amount of ventilation; but my opinion is, that there is a sufficient amount of ventilation in that subway to carry off any escape of gas until the remedy is applied.

1259. As a practical man, will you tell me at all how you would arrange for the supply of the hydrants or feed cocks in the streets with water, if the pipes were placed in the subways?—There is a hydrant in the Garrick-street subway; now I see no objection to hydrants.

1260. How is that arranged?—It runs up in this position (*describing the same*).

1261. How is the water turned on to the hydrant?—It runs up perpendicularly to the middle of the street.

1262. How is it worked?—I do not know.

1263. Do you know whether it is necessary there to go down into the subway for

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for the purpose of turning on the water?—I am not quite sure that there is a necessity for that.

1264. You do not know whether it is so, or not?—I presume it is not, because I see the pipe going through.

1265. But you do not know?—No.

1266. You say you do not consider there would ever be any great damage done by an explosion in one of these subways; surely that must depend, must it not, upon the number of cubic feet of inflammable gas that there may be at any time in the subway?—Just so.

1267. Have you had any experience at all of the accumulation of gas in coal mines?—None at all.

1268. Do you know at all what the explosive power of a single cubic foot of gas of this mixture is?—No.

1269. You have told the Committee that you believe it would be very small, that it would merely lead to a slight disruption in the subway, and that it would not be likely to damage the houses above?—That is my opinion.

1270. Not knowing what the explosive power of the mixture is, and not knowing how much of that explosive body, at any time, would be there?—I beg your pardon; I know some of the effects of it, and I know the proportion which would constitute an explosive mixture; but your question was, how much damage would a cubic foot of gas do, and what its power would be; that I do not know.

1271. It was the Rue des Martyrs which you visited?—Yes.

1272. And saw the subway?—Yes.

1273. Were there any side passages there?—There were.

1274. Now the gentlemen who superintended and who took a part at the time of that accident is still living, the gentleman who was at the head of the Municipality of that day, Monsieur Mary; you did not see him?—I did not see him.

1275. Have you any new designs of your own, for jointing pipes?—No.

1276. I ask you, because you stated to the Committee that the jointing in London was nearly as bad as it could be, and that Paris was worse?—Yes.

1277. I did not know whether you had turned that over in your own mind, and had found any new patent for it?—No, I have not.

1278. Tell me one point; would not the ventilation through these gully holes in the street very often be downwards?—Very frequently.

Re-examined by Mr. *Wilkinson.*

1279. You told my learned friend that the ventilation would sometimes be downwards?—Yes.

1280. Will you explain that?—I apprehend that the inlets or outlets, as we may call them, being distant from one another perhaps 30 yards, or 25 or 26 yards, there would be a supply down one and up another.

1281. There would be still the same current, but in the one case it would be a downward current, and rising through the next ventilator, so that there would in either case be the same through current which is necessary for ventilation?—Yes.

1282. With regard to the damage arising from explosions, my learned friend put to you a theory as to the proportions necessary to cause a strong explosion; you are no chemist, I presume?—No.

1283. But in stating what you did as to the probable results of an explosion in a subway, you spoke from experience?—I did.

1284. From the experience which you have had in analogous cases?—Yes.

1285. As to hydrants, if there had been any apparatus underneath for opening any cock, or anything of that sort, on your visit to the Garrick-street subway, you would have perceived it?—Yes.

1286–7. And you, being satisfied that there is no apparatus of that sort, it follows, does it not, that those hydrants are opened from the top?—Decidedly.

1288. Now, as to freezing, so far as your experience goes, is it not in the areas, and in the connections for reaching the outside cisterns, that the freezing takes place at present?—Yes.

1289. That, I presume, would apply equally to the subway?—Yes.

1290. Therefore,

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1290. Therefore, so far as the subway is concerned, there would be no fear of freezing in the subway?—No.

1291. As to the element of cost, you say you have no practical experience upon that point yourself, but can you suggest any increased element of cost in a subway, that should make it more expensive than the ordinary cost at present?—I am certain that it must be considerably less. I know what is the cost per cubic yard to get it in, and what the cost per ton is to remove the earth, and I know what it costs to erect the requisite shafts over a trolley to get the pipe *in situ*, and to put it down. I have made all those calculations from time to time, and I repeat that it would be a very much cheaper operation for the company to lay their pipes in the subway than to lay them in a trench.

1292. When you gave your former answer as to the amount of experience, you meant to say that you have not been employed in doing this work for the gas companies?—Yes, certainly.

1293. Mr. *Cornwall Legh.*] Will you continue that information which you have just now given; you say that you do not see any reason why the proposed scheme should be more expensive to the companies; will you give me any reason why it should be more expensive to the public?—There is the original cost of the subway, which must necessarily be almost a monumental work; it must be thoroughly well done.

1294. That is not quite the point; it is suggested that the gas companies and the water companies should be obliged by Parliament to place their pipes in this subway when it is made. I want to know from you whether anything occurs to your mind that would justify a great increase of expense to the consumers on account of that subway?—Certainly not.

1295. The companies placing their pipes in the subway would pay a rent, would not they, to the builders of the subway; do you know anything about that?—I believe that it would be quite worth the companies' while, independently of any Act of Parliament, to put their pipes into the subway and to pay a rent, but what the amount of that rent should be I am not prepared to say.

1296. Under those circumstances, would that increase the price to the consumers?—Oh, no; because subways will only be constructed in very important situations, whereas most of these companies have miles and miles of pipe; the question of putting the pipes in the subway can only be concerning pipes to the extent of four miles, or three miles, or two miles, as the case may be; and I do not apprehend that that small proportion will have any effect upon the ultimate charge to the consumers.

1297. Do you think that compulsory powers over these companies, obliging them to put their pipes in those subways, would not materially affect the price of the article to the consumers?—I should think not.

1298. Mr. *Paull.*] That is the advantage that the public are to reap from these subways?—In the non-obstruction of the streets, and non-contamination of the soil; I contend that the avoidance of the accidents which constantly occur now, and the general better method of being supplied with gas and water, would be an advantage; I am quite aware that it is not practicable to carry it over the various miles that the companies have, but it would be a very good thing if it could be so.

1299. As to contamination of the air, has that been productive of illness, or anything of that sort?—In cellars it has been I think very prejudicial, but that will not be cured by subways, because it arises principally from the services, when you speak of contamination of the air.

1300. That is not what may be called a serious disadvantage?—It is the contamination of the soil of London; the soil of the streets I consider that a very serious damage; I have read on various occasions very strong remonstrances from medical men upon that subject.

1301. It becomes serious when the soil is so overcharged as that, the gas exudes from it?—Precisely; where it is detectable.

1302. Is that very much the case in London?—I think so.

1303. Is that sufficiently serious with the other reasons that you have given, to justify Parliament in permitting a public body to levy a rate on the town, for the purpose of constructing subways?—I think so, quite.

1304. You do not happen to know how the means are to be provided for the construction of those subways?—The ratepayers find the money for them, and I apprehend that if the ratepayers could be polled, they would be of the opinion of the Nottingham Corporation, that they would be very happy to incur any danger that can arise from them.

1305. Power is to be taken. I understand, to levy a rate for the purpose of constructing these subways; what I want to know is, the advantage to the public?—I can only give you my opinion as a ratepayer. I think it is perfectly justifiable, and a great advantage to the public to have subways; and I go so far as to say that I should like to see them extended as far as possible. The interruption in the streets is very very serious. The people who are the largest proportion of ratepayers in London, the shopkeepers, and people who live by letting lodgings, and hotel-keepers, who are really the largest contributors in the metropolis, are very prejudicially affected by the operations of the gas companies and the water companies constantly taking up the streets.

1306. *Chairman.*] I understand from your experience, as the owner of property, you think that the public convenience would justify the course proposed?—I think so, certainly.

1307. Mr. *Paull.*] Do you know that the advantage which the companies will reap will be such as to make it a desirable thing for them to pay a rental for the use of these subways?—I have not a doubt upon that subject myself.

1308. You see they now have the power to open the subways, and place their pipes, free of cost?—Yes.

1309. Do you think that the use of subways will be so advantageous to them that they ought to be called upon to pay a rental?—I do. I go so far as to say, that when they have paid that rental, that is to say, a moderate rental, such as it is likely to be, they would wish that the whole of their trenches could be subways, if possible.

1310. Have you ever heard, that it appeared in the course of the inquiry of 1864, that the rental which would be paid in respect to the use of subways in a street was more than the rental which the gas company would receive for the gas that it supplied?—I can hardly understand that. I know nothing about it myself, and, therefore, I cannot speak to it; but I should apprehend that that cannot be the case.

1311. Viscount *Galway.*] You have visited Paris, but you do not seem to think that things are particularly well managed there with regard to gas pipes. Are the gas pipes there held by the Government, or the municipal authorities or private companies?—The whole of the gas companies in Paris have been amalgamated into one large company. One branch of that company is called *The Canalization du Gaz.* That is under a special power. They were very kind and attentive to us when we went there. It is managed by the servants of the Great Gas Company.

1312. But as a matter of fact, that is one large company, and there are no competing companies?—There are no competing companies.

1313. Mr. *Jackson.*] Is there any limit to the price which they charge for gas?—There is.

1314. How is their maximum as compared with the maximum in London?—I think the maximum in Paris is 6 *s.* 8 *d.*

1315. As against 4 *s.* 6 *d.* in London?—Yes, I think so.

1316. Mr. *Floyer.*] In making your comparative estimate of the different modes of laying pipes in the subways and in the street, what mode of introducing the pipes into the subways do you contemplate?—I presume there will be side entrances.

1317. Perhaps you heard that one of the witnesses contemplated the possibility of the necessity of breaking up the crown of the subway for the purpose of introducing the pipes; would that make any material or serious alteration in the result of your comparative estimate?—No; it is a trifling comparison. Of course, under ordinary circumstances, you would only take down one length of pipe at a time.

1318. The expense of breaking up the crown of a subway would not be a serious one?—It would not be a serious expense.

1319. *Chairman.*] Do I understand you to mean this, that you imagine if ordinary means were taken to introduce the pipes of either a gas or water company into a subway, that that would be cheaper than taking up the pavement, digging a deep trench, carrying away the earth, and replacing the whole?—Yes.

1320. In your judgment it would seem to you, wlthout any experience on the subject, that one process would be much more simple and economical than the other; is that what you mean to say?—Yes, quite so; certainly.

[The witness withdrew.

Mr. *William Pole*, called; Examined by Mr. *Cripps*.

Mr. *W. Pole*.

1321. You are a Civil and Mechanical Engineer?—I am.

1322. Of Great George-street, Westminster?—Yes.

1323. You are a Fellow of the Royal Society, I believe?—Yes.

1324. And a Member of the Institute of Civil Engineers?—Yes.

1325. Were you for some time Professor of Engineering at University College?—Yes.

1326. Have you had a considerable amount of practical experience with gas and water works, and similar apparatus?—I have.

1327. Have you been employed by Government upon the subject of water-works?—I have been employed by Government a great deal, and partly on water-works questions.

1328. I think you have also been employed by the Metropolitan Gas Companies?—I have.

1329. Were you employed by them for the purpose of investigating some of the cases of gas explosion?—I was in several.

1330. Was one of those cases that you investigated the case of the explosion which took place in Wood-street, Cheapside?—It was.

1331. Will you mention shortly how it was that that explosion took place?—

Mr. *Jackson.*] Simply ask Mr. Pole whether he agrees with the other witnesses.

1332. Mr. *Cripps.*] Then I will put the question in this way: Would such an explosion as that have taken place if the gas pipe had been laid in a subway?—No; it was caused by an escape, which could not have happened if it had been in a subway.

1333. Were you also employed to investigate the case of explosion which occurred in Oxford-street in 1863?—I was.

1334. With reference to the explosion in Oxford-street, that occurred under the present system?—Yes. I am not quite sure that that has been clearly explained to the Committee, and perhaps I may explain a little more fully how it took place. There was a main laid on the north side of Oxford-street in the middle of the carriage way, but nearer to the footway. The ground under that became loosened, probably by water percolating into it; this took place. There were two pipes jointed together in this way (*producing a model of the pipes*). The traffic over the street caused these pipes, the ground having settled from under them, to be bent down in this way (*describing it on the model*), and the weight of the traffic brought over this socket.

1335. Mr. *Jackson.*] That did not give way, but the socket broke?—The socket broke. This was filled up with lead. The lead offered some degree of resistance, but as soon as the weight of the traffic became so great as to overcome that resistance it broke, and the gas then leaked; and before the fracture was discovered it had found its way across to the south side of Oxford-street, and entered the cellar of one of the houses on the south side. A light was taken into the cellar; the cause was discovered and rectified.

1336. *Chairman.*] By whom were you employed to inquire into this?—By the Chartered Gas Company.

1337. Mr. *Jackson.*] What was the size of that pipe?—I think it was an 8-inch pipe.

1338. Mr. *Cripps.*] I need scarcely ask you whether such an explosion, arising from such a cause as that, could have taken place if that pipe had been laid in a subway?—Certainly not.

1339. Mr. *Duff.*] What depth was that pipe?—The usual depth; I think three or four feet.

1340. Mr. *Cripps.*] Those are the two principal cases of accident that we have had to deal with lately, I believe?—Yes; there was one at Vauxhall, which I need not advert to, because it has nothing to do with pipes.

1341. You have heard, no doubt, of the principal objections which are urged against putting pipes into subways?—I have.

1342. First, with reference to the objection which suggests danger from leakage; how could leakage, under any circumstances, occur in the case of a gas pipe?—It is said that leakage may occur in two ways, from accidental fracture; it is said that it might occur through the body of a pipe, or through the joints.

1343. Assuming the pipe to be laid in a subway upon that system, what would be the effect, in your opinion, upon those two possible causes of leakage; first, with reference to the pipe itself?—First, as to the pipe itself, I do not attach any importance to it. I have had a great deal to do with the manufacture of gas pipes. I have been a practical ironfounder, and I have all my life been acquainted with the manufacture of iron. It is customary, and ought always to be the practice, to prove pipes by hydraulic pressure before they are used. Every founder knows that imperfections may occur in the casting. Sometimes there may be porous places, and sometimes there may be spongy places, or accidental flaws or defects, in the pipes, which are always discovered, if they are of any importance, by the process of proving. As to the gas getting through a solid body of iron, I do not attach any importance to that at all. Whether it may be true as a laboratory experiment, I do not know; certainly it is not of the slightest significance in practice. Therefore I do not think that any escape of that sort of any importance if the pipes have been properly proved. If the process is adopted, which is now very often adopted, of immersing the pipe in Dr. Angus Smith's solution of tar, or even painting and tarring them, there could scarcely be any opening of that kind. I cannot conceive that any practical significance can be attached to the fact of leakage through iron.

1344. The result of what you say is, that if there were any such leakage through the joints, it would be so gradual, and of such a nature as not to give rise to any danger at all?—It would be so slight that it would be impossible to do any harm in a subway of that kind.

1345. That reduces it to a question of leakage at the joints?—In a word; I can conceive that the joints may be quite as well made, if not better made, in the first instance in subways than in the trenches; and then if they are as well made, they are more likely in that position to remain in good condition.

1346. First of all, do you think that the workmen would be better situated and protected for the purpose of making joints in a subway than they are at present for making them in the streets?—I think they would. There would be quite as much room as there is in the narrow trenches, where they always work at an inconvenience; in addition to that, the men would be better protected from the weather.

1347. And the work would not necessarily be done in a hurry, in the way in which it is done at present, for the purpose of covering up the street again quickly?—Yes; as regards the inspection, that could be done more leisurely than it is at present, because there would be no hurry to get the streets covered up again, which necessarily occasions a very hasty inspection, because the street is very hastily covered up. With regard to the pipes in subways, the inspection could be had more leisurely, and that would have a good effect upon the workmen, because it would make them do their work much more carefully; because if the work were not done properly, the defects would be certain to be discovered.

1348. That would afford much greater protection than you have at the present time?—Much greater.

1349. Have you considered the question with reference to the light that would be required for the purpose of working in a subway?—I have. I have been in the subways at present made, and I have noticed particularly what light there is at present. I may say that in the Southwark subway there are openings 100 feet apart; and although there is a grating which stops up a great portion of the opening as regards light, yet the light which comes down at present is very considerable. By placing white paper under two of these openings, I was enabled, or rather my son who was with me, and who has better eyes than I have, to read this book, the print of which is very small, in the subway, half-way between the two openings. That shows that there is a great deal of daylight comes in; and that would be very much increased by making the gratings larger, or even throwing them open when it was necessary, or multiplying them if necessary. That is as regards daylight; but it would not be impossible to introduce artificial light, if it were wanted, without danger.

1350. Would it be possible, if necessary, to have reflectors in order to increase the natural light?—Quite so. In order to show the use of reflectors there, I may mention that there were four small sunbeams coming in through one of the gratings, each about 1¼ inches in diameter, and by simply placing a piece of white paper, it was possible to read this small type at 75 feet distance.

1351. If it was found desirable to increase the light, would not merely whitening the wall have an increasing effect?—Yes; we know that in our houses.

1352. Assuming that natural light of that kind was not sufficient, do you see any objection to the introduction of artificial light if required?—I see none; if the flame is open care must be used; it would be possible to introduce artificial light without exposing the light to the atmosphere of the subway.

1353. Do you know, from your own experience, that at the present time a considerable amount of pipe laying in the streets of London is done at night?—A great deal; I have observed that.

1354. That is done by the light of a flare from the gas?—Yes; that is done in winter a great deal; it is considered desirable to do so by the gas companies in order to avoid interfering with the traffic; I believe during the laying of the mains in the City, on a large scale, some time ago, nearly all the mains were laid at night; I do not know that of my own knowledge.

1355. Assuming the pipes to be once laid in the subway, would they, in your opinion, be less likely to be disarranged afterwards in the subway than they would be if laid in the streets?—Very much.

1356. What are the principal causes of disarrangement of the joints of pipes in the streets as laid under the present system?—The ground being made ground is often liable to give way, and particularly if it is acted upon by water, as was the case in the Oxford-street explosion. Then the traffic over the pipe, which is not generally at a very great depth, is likely to derange the joint, and the consequent interference of the ground by opening the neighbouring pipes, and things of that kind, which are pretty familiar to everybody; all those things disturb the ground; and whenever the ground is disturbed the joints are likely to be disarranged; the joints are made with sockets, and any interference with the ground causes them to bend, and ultimately to leak, if they are much disturbed.

1357. Assuming the pipe to be laid in the subway, does any reason at all occur to you why, if once properly laid, and they are not defective in the first instance, they should from any cause become so?—I cannot conceive any; if a pipe is carefully made, I cannot conceive why the joint should ever leak or become damaged, or deteriorated at all.

1358. It has been suggested, as you are aware no doubt, that the expansion and contraction from the cold and heat might have some effect; what do you say to that?—I do not think that would have any effect in making the joints leak; I have calculated what the variations in the length would be, assuming a difference in the temperature of about 30 degrees, which I think would be the extreme in these subways; and I found that it would be about 1-50th of an inch, which is very much less than the thickness of a sixpence.

1359. Mr. *Jackson.*] In what length?—In nine feet length of pipe, which is the usual length; in each joint there would be about 1-50th of an inch variation; that is corrected at each joint, because one of the great merits of the lead joint at present in use is, that it allows for a slight motion of the pipe without doing any injury.

1360. *Chairman.*] There is a certain amount of elasticity, I presume?—Not quite so; it allows of a little motion through the lead; the lead and the yarn act as a packing, in order that there may be a little motion without doing the joint any harm; that is in fact an expansion joint of itself. There is a packing of yarn at the bottom of the socket, but even the lead itself acts as a packing spigot may act through the lead without doing any harm. Therefore the expansion of each length is corrected in that length; you have no occasion to consider what the expansion of a mile would be, because the expansion is corrected at each joint.

1361. Mr. *Jackson.*] The lead is not affected by the temperature?—No, not at all.

1362. Mr. *Cripps.*] In point of fact, are there numerous instances of gas pipes which are exposed to various degrees of temperature, which you can see whether they are seriously affected or not?—Yes, they exist in the gas works in great numbers; there is one which I have heard there has been trouble with, and that is the pipe over Southwark Bridge. That is not at all a parallel case for two reasons; in the first place, it is exposed to much greater variations of the temperature, it is open to the sun and open to the cold air, so that I should think it would go down from freezing up to, perhaps, 120, when the sun is hot upon it. In the second place, that partakes of the motion of the bridge; it is known by observations that the motion of the bridge by expansion and contraction is considerable, but there is motion in a different direction, by rising and falling, and that would be very likely to derange the joints of the pipes going across that bridge.

1363. You attach no importance to any inference which can be drawn from that case?—I do not think the cases are parallel at all.

1364. Mr. *Jackson.*] Do you know what the deflection is?—I have heard that the bridge rises five or six inches, and of course that must be so, in order to meet the crown of the arch.

1365. There can be no deflection in a subway if these pipes are laid in brickwork? – No, there can only be a movement in the length.

1366. They are not so likely to be disturbed?—No; the Southwark Bridge is quite another case.

1367. Mr. *Cripps.*] I believe you have had considerable practical experience with reference to the question of ventilation?—I have.

1368. Do you think there would be any difficulty whatever in sufficiently ventilating subways?—I think not; I think the present openings in the crown are best adapted for that purpose, and, if necessary, more openings or gratings might be made, and, if necessary, they might be put nearer together; I believe them to be perfectly sufficient for all that is wanted for the purpose of ventilation.

1369. The object of ventilation is to enable the workmen to work in a more comfortable atmosphere there?—That would be one object.

1370. Do you believe that the circulation of the air by means of those openings would be quite sufficient for that purpose?—Perfectly. In the Southwark-street subway the air was perfectly clean everytime I was in it. With regard to the Garrick-street subway, there was a curious instance of the sufficiency of ventilation; while I was in that subway a trap was opened into the sewer, which let a great deal of foul air into the subway; that was found inconvenient, and it was shut down, but very soon afterwards the air became, if not sweet, at any rate much better.

1371. Was there any smell of gas at all when you were down there?—None at all in either case. There was no smell of gas in the earth in any portion of the place where the pipes were open. They were opened not only where this was taken (*producing a sample in a bottle*), but in several other places, and in none of the places was there a smell of gas.

1372. You looked to that particularly with Mr. Bramwell?—I was there at the same time. I have a sample, which I took yesterday (*producing the same*). It is the same thing that was obtained from another place. It was quite as bad as that.

1373. Mr. *Jackson.*] Have you ever tried if that would ignite?—I have not.

1374. Mr. *Cripps.*] Now, with reference to explosion, do you agree with what Mr. Bramwell said, that the effect of laying the pipes in a subway would be to reduce the chances of explosion and danger from them to the minimum?—I do, if ordinary care is used.

1375. Assuming an explosion to take place, with all those dreadful things which Mr. Burke mentioned, what, in your opinion, would be the first effect of that?—In the first place, I think that the quantity of explosive mixture which could be collected would be but small, however the gas escaped, because with those ventilating openings I cannot conceive it likely that any large quantity could collect; and if it did, I am not inclined to think that the consequences would be very severe, judging either by reasoning or analogy from other cases. I conceive that since the explosive mixture would occur only in a very small part of the length of the sewer, the force of the explosion would be expended partly in passing up those openings at such frequent intervals, and partly expended throughout the length of the sewer. Where a close chamber is entirely filled

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filled with the explosive mixture there is no doubt the explosion is severe, but a partial explosion occurring in a long chamber, I cannot conceive will do any very great harm. Its force would be principally expended in the vacant space.

1376. Mr. *Jackson.*] You must bear in mind that there is a continual supply of gas from the pipe?—That would be simple ignition; that would be simple burning. If a light came there it would simply ignite it, and it would do no harm. There can be no frequent explosion because the gas would be simply ignited.

1377. Mr. *Cripps.*] It requires a mixture, of course?—Yes.

1378. Is what you saw there at all confirmed by what takes place in a sewer?—Sewers are long chambers connecting with each other, and the explosive gas only occupies a certain small length of them. The effect is perhaps to burn a place, which may be near, but I have not heard that generally they do much harm, because the force of the explosion is expended by the great length which the gas has to expend its force in. I cannot conceive it possible that with those ventilating precautions any great quantity of explosive matter can be formed. The gas must escape by its natural levity, as naturally as a stone falls to the ground. Gas when it escapes from a pipe would ascend to the roof of the subway, and when it found itself there it would naturally ascend through the first opening it met with.

1379. Now as to corrosion taking place in the pipes, do you think corrosion would be less with reference to pipes laid in subways than with reference to pipes laid in the streets?—Very much less, because in the first place the pipes are not in contact with the wet earth, and are not exposed to the constant wet, which everybody knows is one of the principal causes of corrosion; and in the second place, they are more conveniently got at, and may be more conveniently painted and properly inspected.

1380. Passing from the question of gas to that of water, do you see any objection whatever to laying water pipes in the subways?—I cannot conceive any.

1381. The objection, such as it is, is that there would be a liability to a contamination of the water in the pipes from the gas which has escaped from the gas pipes; what do you say to that?—I should say it is very much less likely to occur where the two pipes are laid side by side in a subway than when they are surrounded by earth like this (*referring to the drawing*).

1382. I dare say you heard Mr. Bramwell's evidence upon that point?—I did.

1383. Do you agree with him?—Perfectly.

1384. With reference to the possible case of a water main bursting, do you think that that would involve any serious difficulty?—I cannot see that it would; it would be very soon discovered; the pipe would be shut off, and the water would run away into the sewer, and it could then be repaired.

1385. *Chairman.*] Can you state what are the causes of the bursting of a water pipe; that does not occur very often?—No; it occurs sometimes without the cause being exactly known; it is supposed to occur through the irregularity of the motion of the water through the pipe; sometimes air gets into the pipe, and sometimes there are concussions in the mains, and if there is a weak place in the pipe sometimes the pipe will go.

1386. That is the great power of hydraulic action?—Yes; and it may be the great power of water in motion.

1387. Mr. *Cripps.*] The mains are not liable to burst from freezing?—No; I believe in large mains the water is above freezing point, and that of course keeps them from bursting; with regard to the small services, there might be danger where the water is stagnant in the small services; but I cannot believe that the temperature in the subway would ever go down to freezing point, even although there was a good ventilation.

1388. *Chairman.*] The motion of the water in the mains would, of course, prevent them freezing, but you think the water might be stagnant in some of the lesser services?—It might become stagnant in some of the lesser services, when the houses are not being served.

1389. Mr. *Cripps.*] If that were so, would it be very easy to protect those small pipes?—Very easy indeed; they are protected in the areas now, if people choose to be at the trouble.

1390. *Chairman.*] You mean by putting straw round them?—Anything to prevent radiation.

Cross-examined by Mr. *Clerk.*

1391. I take it that your opinion is that some classes of accidents which arise now, could not arise if the gas mains and pipes were laid in the subways?—Yes.

1392. I believe the Oxford-street accident was one that you may say was due to the particular way in which the main was laid, but the Wood-street accident was one that was due to carelessness, was it not?—Yes; it was due to the men presuming upon the safety of working in the open air, which presumption is fallacious.

1393. Can you guarantee your workmen hereafter being particularly careful in subways?—I should think they might be made much more careful than they would be in the open streets; they would naturally be more careful.

1394. Why naturally more careful?—Because they would be better looked after.

1395. Do you mean that they are working under circumstances of greater danger?—They would be working under circumstances where carelessness would perhaps be of more consequence.

1396. That is to say, that because they would be working where carelessness would produce greater danger, there would be greater carefulness induced on the part of the workmen?—I should say that when workmen are working where carelessness would produce more serious consequences they would be more careful.

1397. Then if the workmen were very careless, supposing an accident to occur like the Wood-street accident, it would be attended with much more serious results in a subway than in the street?—If the same system were adopted as was pursued with reference to the Wood-street accident, there would be more likely to be an accident in the subway than in the trenches.

1398. Now you say you tried an experiment upon this bright day, as to how far you could read from the aperture in the subway in Southwark-street?—Yes.

1399. But such a day as this would, of course, be no fair comparison with a foggy day in November?—Certainly not.

1400. I may take it that in Southwark-street there are no rows of houses of any considerable length?—That has nothing to do with the question, because the light comes from the sky above.

1401. That would depend upon where the sun was, because there is not much vertical light in the winter time; you would have to work a considerable part of the year with artificial light in the subway, even in the middle of the day?—We might sometimes.

1402. *Chairman.*] There would be no difficulty, I apprehend, in using safety lamps, if there was any risk?—Not at all; and it might be done otherwise; there are plenty of cases.

1403. If there was any danger whatever, a safety lamp might be used without any difficulty?—Yes.

1404. Mr. *Jackson.*] Whatever may be the difficulty as regards light, the danger might be cured by using safety lamps?—It is very common in gasworks to use a lamp which throws a light around, and the flame of which does not communicate with the atmosphere.

1405. Mr. *Clerk.*] As to the main question of light, if the workmen while they were at work were to use Davy lamps, that might no doubt be a safeguard?—Yes.

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1406. But when you come to make your joints with molten lead, you would not be able to do that by means of an unprotected flame?—I think you might perfectly well. You would not melt the lead in the subway.

1407. Where would you do it?—On the ground above, and pass it down through the holes.

1408. And so bring in your molten lead?—Perfectly well. If you look at Mr. Hawkley's evidence you will find that he suggests that that may be done. Nobody would dream of making a fire in a subway: it would be unnecessary.

1409. Do not say nobody would dream of it, because we have been told by Mr. Bazalgette that that was what they dreamt of doing in the Southwark subway; you say there is little risk of explosion, because from the lightness of the gas it would always rise?—Yes.

1410. Wherever there is a place where gas, whether it is coal gas or whether it is inflammable gas, in a coal pit will lodge, you have the risk of an explosion, have you not?—The first effort of gas is to rise to the top of the place where it is.

1411. And there it may remain?—It would not remain there, because it ascends to the openings, by which it can rise higher.

1412. It may rest between the two?—No; not any more than water would rest on a floor.

1413. That is to say, supposing that there would be always a current of air running along under the roof of the subway?—No, it is certainly not on that supposition. The gas would naturally spread itself along the top, and it would find its way naturally to the openings. It would pass along until it came to them.

1414. You cannot conceive that gas would ever rest either there or in any lateral openings?—It could not rest in these lateral openings, because it would rise to the top one. The most unfavourable supposition I can make with regard to a subway is, that the atmosphere should be perfectly still, with no current through it at all, and in that case the gas would certainly rise up to the top, and would escape by those openings.

1415. With a low state of the barometer, with a light wind, might it not be the case that there might be a downcast through all of the apertures, and not an upcast through them?—It would be quite impossible that there should be a downcast through them, because what would become of the air that ran down?

1416. There would be no upcast then?—If there was no air through the openings the air would remain stationary. If, under those circumstances, you could stop the gas, the gas would rise to the top and immediately pass out of those openings. It is impossible it can collect; it is contrary to the nature of things that it can, if those openings are kept open.

1417. Of course, if there was an explosion, because of the bursting of any gas pipe in the neighbourhood letting free a quantity of gas, it would also burst any water pipe which there might be in the subway?—If the explosion was serious it might.

1418. As yet you have not had any experience of what an explosion in a subway would be?—We have had a great deal of experience of what explosions in sewers are.

1419. But there are no water pipes or gas pipes in sewers?—No.

Re-examined by Mr. *Rodwell.*

1420. You can judge of the effect of an explosion without having a water pipe there?—By analogy.

1421. My friend's theory, that the gas would lodge on the roof of this subway, is opposed to all scientific knowledge, is it not?—Quite so. It would not do that any more than water would lodge on the floor of a room in which openings are made.

1422. It is a rule with gas that that cannot happen?—It is contrary to the natural action of gravity.

1423. Whether the air is stagnant, or whether there is a current, of course the greater the escape of the gas, the greater the rise?—If there is no current, which is the most unfavourable state of things I can conceive of, gas would naturally, by its own levity, ascend, just the same as a stone falls to the ground.

1424. Could the accident which happened in Wood-street have occurred if the pipes had been in a subway at that time?—No.

1425. My friend has asked you about the carelessness or carefulness of the workmen. Would not the workmen be much more open to inspection, and better looked after in a subway than they are now by the mode in which the work is done in the trenches?—I should think they would. Everything they did would be much better done.

Examined by the *Committee.*

1426. Mr. *Paull.*] Is it true that, wherever there are shafts out of a tunnel, there is always an up-draught?—I do not think that is universally true. It does not follow that there should always be an up-draught; there may be no cause to move the air upwards.

1427. Then, if that be so, there might be an accumulation of gas in these subways?—Pardon me, you put a different case, you spoke of air, but the moment you substitute gas, I cannot give you the same answer. If there is an escape of gas, it must rise; air need not rise, because there is no difference in specific gravity between that and the air above. But, with reference to the specific gravity of gas in a subway and air, the circumstances are quite changed; it must rise then, because there must be an upward current. With gas there must be an upward current through the openings.

1428. But then, are you aware that a very small portion of gas mixed with atmospheric air makes the most explosive compound?—I know what the general impressions are. I believe one to ten is the most explosive.

1429. The more gas that would escape, the less explosive would the compound be; that is to say, if you had five or six parts of gas with the same quantity of air, it would be less explosive than if there were one part gas and nine parts of air; that is so, is it not?—Yes.

1430. If a small portion of gas should escape from the pipe, having a sufficient volume to establish for itself a draft up the shaft, would not that be likely to hang about the roof?—I think not, because the power of establishing a draught in the shaft does not depend upon the quantity of gas, but upon its specific gravity. If you drop a marble it will fall to the floor just in the same manner as a cannon ball would, therefore, if I liberate a cubic inch of gas that would have a tendency to rise to the top, just the same as 1,000 cubic feet of gas would.

1431. You know the Metropolitan Railway, no doubt?—Yes.

1432. Do you know the stations at Great Portland-road and at Gower-street?—Yes.

1433. The shaft at Great Portland-road, I suppose, is as large as this room, and at Gower-street there are 40 or 50 gratings on each side?—Yes.

1434. Do they suffice for ventilating that tunnel?—No, not to render it perfectly sweet; but the circumstances there are quite different. There is a vast quantity of foul air produced by the engines, which has just the opposite property, the air outside possessing only half the specific gravity of that; you cannot get it out.

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1435. How about the sulphurous vapours which we smell in that tunnel; that is a gas, I presume, is it not?—No, it is not; I know many people call carbonic acid, sulphur. The gas which comes from the coke is undeniably carbonic acid; it can be nothing less. It may be tainted with sulphur, but there is no hydrogen if they burn coke. They could not burn coal, because that would not be tolerated; but, burning coke, there is no hydrogen; it is entirely carbonic acid, which is a very heavy gas; we can measure it like water. That is the kind of gas which you get on the Metropolitan Railway.

1436. That accounts for the tunnel not being adequately ventilated?—I think so; there is nothing to establish any draught along it, and the gas will not rise.

1437. Mr. *Jackson.*] Except by the motion of the engine itself?—No.

1438. Mr. *Floyer.*] What is the tendency of gas to mix with atmospheric air, does it mix readily or not; you have spoken of it as if it were disposed to keep separate?—That is a question rather for a chemist than for me; but I will state what I know about it; my impression is, that the first effort of gas is a separate effort; if gas leaks from a pipe it will endeavour to rise separately; but it is a fact well known to chemists, that if you couple two gases of different specific gravities, though they may be such as if kept long together in a quiet state they will mix; if you confine the gas and prevent it getting away, which is its first most natural effort, it would certainly mix with the air and form an intimate union of the two.

1439. Supposing it mixed readily on its escaping from the pipe in that proportion when it becomes explosive, is then the specific gravity of that mixture so different from the air as to cause it necessarily to rise more speedily?—It must always be lighter, and therefore will have a tendency to rise; the specific gravity will depend on the mixture of the two; there is no chemical mixture, it is simply a mechanical mixture, and the specific gravity will be just what the mixture gives; if we mix air and a lighter gas, then the specific gravity of the combination must be lighter than the air, and therefore it is well known that the tendency to escape will not be so strong as that of the gas alone.

1440. The difference of the specific gravity will be very small when the mixture is explosive?—I have no doubt that is so; but pardon me for saying that that is founded on the hypothesis you have mentioned, that you allow them to mix quietly and slowly; that is a state of things the existence of which I do not admit in a subway, because the first effort of gas is to rise: I believe if the ventilating openings are kept open that it will rise.

1441. Mr. *Duff.*] Suppose gas to rise in this subway, and there is no draught in the subway, what is to make the gas go along the subway?—It would be the same thing that would make water run along this floor; its first effort is to spread itself.

1442. Suppose there is no draught, why would the gas go to the top?—It will be the same as with mercury, which will spread itself over the floor; if a quantity of mercury is poured out on that table, it will not remain in a heap, but will spread itself out. Just conceive that experiment inverted; as I have said, if you pour mercury on this table it will spread itself out, and find the first opportunity of falling further down; if you invert that experiment and throw gas against the roof of a subway, it will spread itself out until it finds its way out by means of the openings.

[The Witness withdrew.

Mr. *Frederick John Evans*, called; Examined by Mr. *Wilkinson.*

Mr. *F. J. Evans.*

1443. I BELIEVE you are the Engineer of the Chartered Gas Company?—I am.

1444. You are also a member of the Institute of Civil Engineers?—Yes.

1445. What is your opinion with reference to putting gas pipes into subways?—I think putting gas mains into subways is a safer plan than the plan which is adopted at the present time; I think there is much less chance of an accident occurring; in fact, I think the chances are diminished to a minimum.

1446. Without taking you into the details, which my friends can do if they think necessary, in cross-examination, do you concur with the evidence already given which you have heard in this room?—I do, completely.

1447. Have you considered the question, so far as water mains are concerned? —My opinion is, that if a gas main can be laid safely, there is no question about water mains.

1448. You have still less doubt upon that point, if there was any doubt at all? —Yes.

1449. You were not examined, I think, in 1864?—I was not.

1450. With regard to the danger from gas mains being placed in subways, let me direct your attention particularly to that; what is your opinion upon that subject?—I think there is much less chance of an explosion occurring with a main in a subway than there would be with a main outside it. A main may be perfectly quiet, and there is no chance of its being disturbed. I think when it is once laid, and laid soundly, in a subway, that it would remain so, which would not be the case if laid outside.

1451. Have you any practical knowledge as to the cost?—I think the cost would be less in the first instance.

1452. The cost of what?—The cost of laying a main, because we should save all the expense of the paving, opening the ground, and carting away the rubbish.

1453. Now let me direct your attention to the subways which are offered as an illustration; you have, I believe, inspected both the Southwark and the Garrick-street subways?—I have.

1454. From your actual inspection of these subways, did it occur to you that there would be any difficulty in working the pipes in the way in which it might be necessary to work them?—No, I did not see any at all.

1455. Would there be any difficulty in making the connections?—None.

1456. What is your opinion with regard to the services; do you think that they should be laid in a different way to what they are outside?—I think the services should be laid originally when the main is laid. As I understand these subways, they form part of a general system, by which there would be houses on each side, and you would lay the service at once into the houses.

1457. Do I understand you to say that the service should be laid prospectively with respect to future wants, so as to avoid a disturbance from time to time?—Precisely.

1458. Have you any explanation to offer with regard to explosions from gas, which have come under your notice?—We have had a great number of explosions connected with our company, and I am satisfied that many of those explosions would not have occurred if the mains had been laid in subways.

1459. Oxford-street, particularly, I think?—Yes; and many others.

1460. Would one circumstance be that the gas escapes from the subway into the open air?—Yes, it would.

1461. You heard the evidence given as to the damage which would be occasioned, supposing an explosion were to occur in a subway?—Yes.

1462. What is your opinion upon that point?—I think it would be limited; I have made a number of experiments to determine that point, with explosive mixtures, and I am satisfied you cannot blow up a subway.

1463. Will you be kind enough just to explain what those experiments were? —I originally made an experiment for the purpose of ascertaining what the explosive power of gas really was; I think I fixed it at a certain standard as compared with gunpowder; I then wanted to ascertain the effect that would be produced by exploding gas in a subway; of course, I could not do it in a subway, but I tried it by having a wooden box made, 10 feet long and 4 feet square; that represented a subway; the two ends were blocked up; I then introduced four cubic feet of explosive mixture in a tin can, which would represent an explosion in a certain part of the subway, supposing you can get a certain part of the subway full of explosive matter, and that blew the box to pieces; I then fitted up a box in the same way, and had some holes made at the top, which would be represented by the ventilators; I exploded it just in the same way; the box was not hurt in the slightest degree; in fact, the whole force of the explosion went downwards.

1464. Viscount *Galway.*] Where were you when you exploded it?—Close by; I exploded it by a fuse; of course I ran a little on one side; on the subject of ventilation, I can mention one experiment which I made on purpose to see whether you can make gas escape in a room, and it could not be seen; I did that in my dining room, which is 22 feet by 16, and 10 feet high; I have five gas lights

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lights in that; there is ventilation into the chimney with one of Arnott's valves; I went home one afternoon at four o'clock, in the winter, and turned off one of the lights; I then turned it up; I let that go on until we went to bed at half past 10; no one perceived the smell of gas; I asked Mrs. Evans after I had done so, "What do you think of that; that is a good experiment;" she did not perceive the gas at all; the gas would go up at once, and pass out through Arnott's ventilator; it is all a question of ventilation.

1465. Mr. *Wilkinson.*] Has the result of those experiments been to satisfy you that the alarm which had been expressed on that point, is unfounded?—I am quite satisfied of that; in fact, I should not have recommended our directors to use subways in the way I have done, if I were not; we have applied to the Metropolitan Board of Works for liberty to lay pipes in a subway along the Thames Embankment; we did so upon the amalgamation of the Chartered and City Gas Companies.

1466. Viscount *Galway.*] When you made these experiments were the other four lights burning?—Yes.

1467. Would not that practically account for your getting off so well?—Just so; but I should have no hesitation in doing it with the four lights shut off.

1468. But still the other four burners being lighted affected it?—Yes; no doubt the flame would produce a draught upwards.

1469. Mr. *Wilkinson.*] You are now, as a gas engineer, quite prepared to avail yourself of the advantages of subways, and to lay your gas pipes along them?—I should be very glad indeed to do so.

Cross-examined by Mr. *Richards.*

1470. You are practically alone in your views among gas engineers?—No, I think not.

1471. Out of about 20 gas engineers in London, you are the only man prepared to give the evidence which you have done?—No; I think there is Mr. Jones of the Commercial Company, who also agrees with me.

1472. You think some of them are not of the same opinion as you?—There are some not of the same opinion, no doubt.

1473. You recommend your directors to lay pipes in subways, do you?—I recommend them to avail themselves of the subway which is to pass along the Thames Embankment.

1474. The result of your recommendation was that they petitioned against this Bill?—Not upon that ground.

1475. But they have petitioned against this Bill?—It is more with regard to the general question of being compelled to pay a sum of money.

1476. They state in their petition that one of their grounds for petitioning against the Bill is the danger of explosion?—No doubt they do; I know there is a feeling with many of our directors that it is a question of danger.

1477. Was it your own gas that you put into this big box?—I live at Brentford.

1478. Then it was gas from the Brentford Company, not your own gas?—No.

1479. You say that many of the explosions which have occurred would not have occurred if the mains had been laid in subways?—I think so.

1480. Do you say that the Wood-street accident would not have taken place if the pipes had been laid in a subway?—That is the Central Company. I know nothing about that.

1481. I take the one with which you are acquainted; the explosion which took place in Leicester-square, where you have got a bill to pay of 80,000 *l.*?—That was not an explosion; that was a case of an escape of gas in the house.

1482. I do not want to pledge you to anything, because I am aware there is an action going on; you say it is not your fault, but the people in Leicester-square say it was your fault?—That has nothing to do with gas in a subway; that was an escape in the house.

1483. That might have occurred whether the pipe was in a subway or not?—That was in a house; the company had nothing to do with it.

1484. I suppose the cost of laying the pipes in subways will depend to some extent upon the accumulation in number of the pipes, and the difficulty of getting them into subways, will it not?—There is no doubt that that would have something to do with it.

1485. One of the recommendations is, that the companies should be taxed with a sort of rent, and that to that should be added the cost of laying the pipes in the subways?—That would be an annual charge.

1486. It would be an annual charge, increasing the cost of laying the pipes in the subways?—There is no doubt about that; but against that I think if there was a moderate charge, assuming that we should ultimately avoid the necessity of having to disturb the ground, and no paving to pay for, that would be an equivalent.

1487. What is your notion; would that pay a fair good sum by way of percentage upon the cost of the outlay?—I have not gone into the question of paying at all; I merely give my evidence as to the practicability and safety of the thing.

1488. Leaving out of consideration altogether what the companies may be called upon to pay in the shape of rent?—Quite so; that is a question for the directors themselves.

1489. The second gas experiment you made in the dining-room was only to show how well the dining-room was ventilated?—It was merely to show that the gas would rise up if there was an opening for it, and that it would escape without any danger of an explosion; that is all. That experiment was made two or three years ago.

1490. You treat the risk of explosion from pipes laid in the subways as very slight indeed?—I think it is very much less than it is under our present snstem.

1491. So that the person who is responsible for any accident arising from it would be in point of fact taking upon himself no material risk?—I think not more than there is at present.

1492. If there were two bodies, one insisting on the pipes being laid in the subways, and the other body preferring that the pipes should be laid in the ground, you think that the body which insists upon the pipes being laid in the subways should take that risk on themselves?—There would be no objection to it. We should be very glad if the Metropolitan Board of Works would take the risk. I do not fear any great explosion.

1493. You think that the risk would be infinitesimally small?—I think it is.

1494. Do you think that, of the two bodies, the body that object to have their pipes in the subways are the proper persons to take that risk, or those who insist on the pipes being taken into the subways?—If you put it in that way, I should certainly say that those who insisted upon the pipes being laid in the subways should take the risk.

Re-examined by Mr. *Rodwell.*

1495. Now your connection with the gas companies comes out?—Yes.

1496. What I understand you to say is, that you come forward merely to speak to the practicability of this scheme?—Just so.

1497. I understand your opinion to agree with the language of Clause 10; you think that a pecuniary benefit would accrue to the company, body, or person, using the subway, by means of saving in respect to leakage, and in respect of the expense of, and connected with, the laying, fitting, inspection, and repair of pipes, and the opening and relaying of roads, and paving, and repairing, and otherwise, by reason of the use of the subway?—I do.

1498. My friend asked you about explosions from gas; I believe gas is as capable of being controlled as steam, is it not?—Yes, no doubt.

1499. Gas is employed as a motive power, is it not?—Very extensively.

1500. Gas being used as a motive power, therefore you can control and moderate the use of gas?—Yes, we have gas engines.

1501. I suppose the best test of your confidence in this scheme is that you have satisfied yourself by the experiments you have made on the subject?—I have.

1502. From the result of those experiments you are confirmed in the opinion which you had formed previously, and you have advised your company, of whom I suppose you are the responsible engineer?—Yes, I am.

1503. You

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1503. You say that the danger of explosion would be reduced to the minimum if the gas pipes were laid in the subway. Do I understand you wish the Committee to infer that the Company would get rid of many of the causes of those explosions which are occasionally happening?—I think they will, certainly. I think the pipes would be comparatively safe, so far as human hands can make them safe.

Examined by the *Committee.*

1504. Viscount *Galway.*] It seems that your Company petition against the Bill?—They do.

1505. Are you aware whether the petition expresses only the opinion of a portion of the directors upon the subject of the Bill, or not?—I believe there is a general feeling amongst our directors that although the subways may be perfectly safe, or safer than the present system, still, if an accident did occur, it would be attended with very disastrous results.

1506. Then your fears are more with regard to the danger of explosion than expense?—Yes, the two together. I think the directors are generally of opinion that subways would be a good thing provided we could insure against any accident whatever.

1507. They are not so much afraid of the expense?—No; they admit that it would be a public benefit, and would be useful to gas companies.

1508. I do not mean expense with regard to what they might be called upon to pay as compensation from explosions, or for repairing damage caused by explosions, as the expense of putting the pipes into the subway, and the rent they would be called upon to pay, and other things?—I think that would be a secondary consideration if they could satisfy themselves there would be no danger of explosion, and they would be willing to adopt them; but they cannot bring their minds to that in the way that I do.

1509. You cannot persuade all of them to try the experiment in their houses, which you tried in your house?—I think many would try it.

1510. Mr. *Jackson.*] What your directors want, is to throw the responsibility for any damage that might ensue, in consequence of carrying the gas mains of the companies through the subways, upon the Metropolitan Board of Works?—Yes.

1511. What they want is, that the companies should not lose, but that the Metropolitan Board of Works should?—Yes.

1512. That is the reason why they petition against the Bill?—The Metropolitan Board of Works say there is no danger; the gas companies say, if there is no danger you must guarantee us against the expense.

1513. *Chairman.*] Do your directors object to your coming here to give evidence?—Not at all.

1514. Mr. *Legh.*] If I understand you right, you mean to say that the company have an objection to this Bill, because they do not like to be compelled to do what they wish to stand the risk of doing?—Yes, that is so.

1515. Then in addition to that have they any feeling that if their profits are limited by Act of Parliament, that in consequence of the rent and the very great additional expense which will have to be incurred, the companies might not derive so much advantage from their undertakings as they anticipated?—That would be so if there was a heavy charge made for rent.

1516. So that, in point of fact, if the removal of the mains already existing into the subways would cause a large expense, these companies would be very materially affected by it?—There is no doubt they would.

Mr. *Rodwell* explained that that expense was provided for by Section 5, and to be determined by arbitration.

1517. Mr. *Duff.*] Does your company insure against accidents?—No.

1518. Mr. *Bagwell.*] Supposing you lay down for the first time a mile of new gas pipe, how much does that cost?—It depends on the size of the main.

1519. Take the general size of a main?—They vary from two feet up to three feet.

1520. Supposing the largest main, what would be the cost of that?—Taking a 14-inch main that would cost about 10,000 *l.* a mile.

1521. To lay down in the street?—That would be the cost altogether.

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1522. I am referring to the cost of labour, I do not mean the material?—To lay down a pipe of that size would cost about 15 *s.* a yard run for labour only.

1523. Then that would be capital sunk?—Yes.

1524. If that sum of 15 *s.* per yard was capitalised, it would produce a very considerable rent for a subway, where you would have so much less expense?—It would, no doubt.

1525. It would produce a large rent from many gas companies making new arrangements?—Taking the variation from 3 inches up to 30, it would vary from 200 *l.* to 1,000 *l.* a mile of saving, that is as far as labour and paving only are concerned; paving forms a very considerable item in the expenses of gas companies.

1526. Can you form any approximate estimate of what the expense of keeping up when once you have laid down your mains is; what is the further expense which you are put to per mile for keeping your gas pipes in working order?—If there are no water mains laid by the side of gas mains, or no sewer made, supposing the ground is not disturbed at all, we should not be at a very great expense in laying a new main; the principal expense is paving.

1527. What is the expense of keeping it in working order after it is laid? —There is always a certain expense to incur for the paving; after the pavement has been laid a certain time it will sink; after you have laid it, in about a month or so it will require to be repaved in consequence of the sinking of the ground, and perhaps after six or even twelve months the ground has gone down still more; the pavement has got out of the level, and they call upon us to do it a third time.

1528. I call all that the original cost of laying down a main. I ask, after you have got it all perfect, what is the annual cost of keeping it in order?—I do not think there would be any; there need not be.

1529. They take up mains every day all over the metropolis, and therefore there must be some expense attending that?—That must be for laying new services.

1530. No; for keeping things in order in a street such as Eaton Place, for example, where every house has got a service; can you give any approximate idea of the cost when once such a street as that is provided with gas, and a pipe laid down, of keeping that in order afterwards?—I do not think there would be any cost at all, except an accident occurred; there are occasional leakages, and the ground has to be opened for that.

1531. Viscount *Galway.*] How many miles has your company?—One hundred and sixty.

1532. Mr. *Paull.*] Is the chief object of the companies that, whereas now, if an explosion takes place, it is probably limited to one house, if an explosion were to take place in a subway it might break up a road, and extend to an indefinite number of houses?—Yes, I think that is the principal danger they anticipate, that if an explosion does take place, it would be upon such a large scale, that the consequences would be most disastrous.

1533. It might be, in the words of the Phœnix Company's petition, "That the Company's lighting the district might be ruined by claims for compensation"?—Yes, that is their fear.

1534. I think you were asked about the explosion which took place in Leicester-square, can you say what were the claims made against your Company for compensation in that case?—That was not an explosion; I expect that will cost the company, if decided against them, something like 70,000 *l.* or 80,000 *l.*

1535. That was a case of an explosion in one house?—It was not an explosion; it was an escape of gas in a house.

1536. However, it took place; the claims arose out of the escape?—They arose out of an escape.

1537. Viscount *Galway.*] That would not have happened in a subway?—No.

1538. *Chairman.*] The question was, who turned off the gas, was it not?—Yes.

The *Chairman* stated that the Committee had agreed to meet at the Garrick Club, at 11 o'clock on Friday, and requested Mr. Smith, or some one connected with the Metropolitan Board of Works, to provide two or three carriages

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carriages to take them to the Southwark-street sewer, and afterwards the Committee would return to the Committee-room.

Mr. *Denison* presumed that there would be liberty for somebody to attend on the part of the Gas Companies.

The *Chairman* replied that any one whom the Gas Companies might select would have liberty to attend.

[Mr. *Tite* was here obliged to leave, and was succeeded in the Chair by Viscount *Galway*.]

[The Witness withdrew.

Mr. *Robert Jones*, called in; Examined by Mr. *Wilkinson*.

Mr. *R. Jones.*

1539. I BELIEVE you are Engineer to the Commercial Gas Company?—Yes.

1540. You are also Consulting Engineer to other companies?—Yes.

1541. You ave had 33 years' experience in the erection of gasworks, laying on mains, and the general management of gasworks in London and the provinces?—Yes.

1542. You, I believe, gave evidence in 1864?—I did.

1543. You have heard the evidence given during the course of this inquiry, or a great proportion of it?—Yes.

1544. Do you concur generally in the opinions which have been expressed in favour of laying both gas pipes and water pipes in subways?—Yes; most decidedly.

1545. In fact, you expressed that opinion strongly in 1864, and nothing has occurred to change or modify that opinion since?—Nothing; on the contrary, that opinion is rather confirmed.

1546. You have had practical experience, I think, in the laying of pipes in subways yourself?—Only so far as the Southwark-street subway is concerned.

1547. Be kind enough to state what you did with regard to the Southwark-street subway?—In 1864, after I had given my evidence, I asked permission to be allowed to put certain pipes in the subway, and to lay them in the ordinary manner that pipes are laid in open trenches.

1548. You adopted, in laying those pipes in the subways, the same process that is adopted in the open streets?—Precisely.

1549. That would be melting lead in the subways, and stopping the passage of the gas by what we have heard termed "bladdering"?—Yes, precisely in the way we lay them in the street. I had a large coke fire in the subway; we attached the pipe that we found in a subway that had been laid there two years before to the pipe that we fixed. We fixed that pipe up by an india-rubber bladder in the same way that we adopted in the streets. We laid a number of pipes, 18 inches, 10 inches, and 6 inches, with the gas on from the main, using naked candles in performing the work.

1550. You also inserted a certain number of services?—We inserted at the same time a number of services without taking any precautions to prevent an escape of gas. We had no evil consequences at all. I had no apprehension and no fear whatever, and the result proved that I was quite right in the opinion that I had formed, and that it was quite competent to lay large mains and small mains in such a subway as I had then with perfect safety.

1551. You remember, in 1864, that an objection was made that subways would not contain the number of pipes required by the different companies?—Yes.

1552. With reference to that objection, and the evidence then given, have you recently laid down, by the direction of the Metropolitan Board of Works, a number of mains in the Southwark-street subway, sufficient to meet the requirements which were given in evidence by the companies in 1864?—Yes; we have laid two 18-inch, two 9-inch, and two 6-inch, as represented upon this section.

1553. Six distinct sets of pipes?—Yes.

1554. How many yards?—Of the 18-inch pipe, and 9-inch pipe, about 150 yards.

1555. And without the gas being allowed to flow from the main?—In doing that work, we did it without the gas being allowed to flow. We did not connect our gas until we had completed the work.

1555.* That is the mode of dealing with the mains which you recommended when they were laid down in subways?—Yes; I should have no fear in laying them in the ordinay way, but it seems that it is a matter of alarm with some people. Therefore, I adopted another plan on this occasion.

1556. Was that other plan attended with greater cost?—No, not any greater cost; a very trifling less cost; it would be less the cost of the bladder.

1557. And without any great difficulty?—Oh, no, there would not be the slightest difficulty in the world; the man made every joint there with the most perfect ease, and perhaps you will have a man here to-morrow who will show you the size of the bladder; they got round those pipes with perfect ease.

1558. Your experience went to 150 yards in length?—Yes.

1559. Would it strike your mind that there would be any difficulty in carrying that out for miles?—Oh dear, no, not for any length.

1560. Would that be a fair experiment of what would be the result if carried to any distance?—I think so.

1561. Did you test your pipe?—We have been testing them constantly from the time we laid them down, which was the 14th of March last.

1562. Under what pressure?—Under 12 inches of pressure, nine inches of pressure, six inches of pressure, and four inches of pressure.

1563. When you talk of a pressure of 12 inches, is not that very much above the pressure which would be necessary to light any houses or shops?—Oh dear, yes, seven or eight times greater than would be necessary.

1564. Then that pressure of 12 inches is what is ordinarily employed to test the strength of pipes?—Yes.

1565. And far above the ordinary degree of pressure which is required in ordinary service?—Yes.

1566. *Chairman.*] What is the ordinary pressure?—We found the day pressure in that street to be 1·2 of an inch; at night the pressure was raised to two inches; that was the extreme pressure.

1567. Was the result of your testing, that you found anything faulty?—There was not the slightest leak that we could detect in any possible way; not the slightest escape of gas.

1568. Mr. *Jackson.*] Under a pressure of 12 inches?—Under a pressure of 12 inches, although some of those joints were made of spun yarn and red lead driven into the joint.

1569. A packing of yarn only?—Yes.

1570. *Chairman.*] Did you test the joints as well?—We tested the whole length of the pipes; we did not find the slightest possible leak; that has been going on since that time, and we have never been able to detect in any one instance a leakage of gas.

1571. Mr. *Wilkinson.*] When you state that some of these joints were made only in this way, with a packing of yarn and red lead, that is not the mode of joining which you usually apply to gas pipes?—Certainly not.

1572. In what respect does that differ from the ordinary mode of joining?—We usually employ the ordinary metallic lead.

1573. I understand you to say that the bulk of the joints in this case were made with metallic lead?—The bulk of the joints were made with ordinary lead. There were three upon the 18-inch pipes, and three on the 9-inch pipes, made with simple packing, without the slightest escape of gas from any of the joints.

1574. Were they made with the object of testing the joint, under what would be rather disadvantageous circumstances?—That was so.

1575. Where did you get your supply of gas from?—From the Phœnix Company; from a pipe we found in the subway laid about five years ago, I think. There were two pipes laid five years ago there.

1576. Those are the small pipes which supply the street lamps?—Yes.

1577. Those have been lying in the subway, as you describe it, without any leakage?—There is not the slightest leakage from those pipes.

1578. *Chairman.*] Did you ever visit Nottingham?—I have not.

1579. Mr. *Wilkinson.*] Have you anything to say upon the subject of light in the Southwark subway?—We used to lay the mains by naked candles in both cases.

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1580. Did you at all use the reflector suggested by Mr. Bazalgette?—I did not; that was suggested afterwards. I should have been glad if that had struck me in the first instance. I was in the subway when those reflectors were used, and the amount of light we got from them was marvellous.

1581. You have yourself practical experience of the value of those reflectors for the purpose of increasing light?—Yes.

1582. When those reflectors were used, was there light enough to have performed any ordinary operation?—Yes; I saw distinctly the time by my watch midway between the two reflectors.

1583. I believe Henry Edward Jones is your son, who conducted the whole of the works?—Yes.

1584. I believe he will be called, therefore I need not detain the Committee by asking you any questions with respect to that; perhaps you can give the Committee some evidence as to the actual cost of laying those pipes?—Yes.

1585. Have you a table which you can put in if desired?—Yes; the whole cost of laying the 18-inch main was 5 *s.* 3 *d.* per yard, including cartage and every cost.

1586. Mr. *Jackson,*] Cartage from where?—From the City-road Canal Basin.

1587. Mr. *Wilkinson.*] You are prepared to give my learned friends the details of that if they require it?—Yes.

1588. Can you at all contrast that with the cost of laying a pipe of the same diameter in the open street?—We pay the contractor 7 *s.* per yard for laying the same sized pipes, that is for one paving, but generally speaking we have to do a second paving, which would come to 2 *s.* per yard more.

1589. So that including the double paving, I understand you to say the cost would be 9 *s.*?—It would be 9 *s.*, including the double paving; but we only pay 5 *s.* 3 *d.*

1590. As I understand you, it is 5 *s.* 3 *d.* contrasted with 7 *s.* per yard single paving, and 9 *s.* per yard double paving?—That is so.

1591. *Chairman.*] Are these pipes laid in the subways as if they were permanent?—Yes; they are laid as permanent pipes.

1592. Mr. *Wilkinson.*] How are those large 18-inch pipes laid in the subway?—Some of them are laid on wooden chairs, and others on brick piers; they are laid on a very solid bottom; we have laid the majority of them upon small wooden chairs, four inches in diameter on the top surface; we have placed one of those chairs under every pipe near the joint, and we found not the slightest compression into the bottom of the subway itself by the weight of the pipe, so solid is the bottom of the subway.

1593. Mr. *Jackson.*] What is the bottom?—Gravel.

1594. *Chairman.*] What is the wood that you use?—Simple deal; as a permanent experiment, I should use brick piers.

1595. Mr. *Duff.*] Does the 5 *s.* 3 *d.* include the expense of brick piers?—It includes the wooden piers, not brick ones; that would put 6 *d.* per yard more on it.

1596. Mr. *Wilkinson.*] The brick piers would make it 5 *s.* 9 *d.* a yard?—Yes.

1597. Do you recommend brick piers?—If I were laying a main to be a permanent thing, I should lay it on brick piers certainly.

1598. That is done, in fact, in the subways?—When I said brick piers, I did not think it necessary to use brick piers, because I was only making an experiment.

1599. I believe you are now actually making experiments for laying a main under the docks?—Yes. It is Hobson's choice; we must either lay a pipe through the bottom of the bed of the docks at Millwall, or adopt the subway, which has been made across the entrance to those docks. The descent to the bottom is 45 feet, which is not a great distance, but still it is without any ventilation whatever. At the instance of the East London Waterworks, we were called upon to remove our main. We have got the choice of placing it through the subway, which I am very pleased to adopt. That is Millwall Dock.

1600. That is in fulfilment of an obligation laid upon you by Act of Parliament?—That is so; we have no other mode of doing it.

1601. *Chairman.*] What is the length?—It is not a great distance; I think not more than 50 or 60 feet.

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1602. Mr. *Jackson.*] That is the width of the opening?—Yes; we have a descent of 45 feet, and of course it rises on the other side 45 feet.

1603. Then you will be obliged to put a syphon there?—We shall of course use a syphon.

Cross examined by Mr. *Denison.*

1604. I suppose no communication pipe will be attached to that one, it is so short?—That is to cross the dock.

1605. When it is once done it is done for good?—Yes.

1606. You hardly anticipate that going by the river, I should think?—I do not see the reason it should not do so.

1607. Do you really mean to say that you expect you can maintain pipes in any length without their being sometimes affected?—I should judge of the pipe I have laid round my works. I have several hundred yards of pipe laid through my own works upon brick piers, and upon brackets along the walls, and subject to the temperature of the gas passing into them very high and gradually cooling to a low temperature. I have managed those works for something like 13 years, and I have not known a single instance of an escape from any of those pipes.

1608. Are there any service pipes laid out of them?—Oh, yes, there are pipes for various purposes laid from them.

1609. In what lengths?—Various lengths.

1610. What length of subway is there in this case?—Some portion of it is in the subway, and another portion of it is in the open air, but still laid on brackets or brick piers. My experience is that wherever we have mains laid in that way, that we never have had a drawn joint, or a leaky joint. In this case I am speaking positively when I say that in 13 years, and I have made inquiry this morning from other people about the works, we have not had a single circumstance of any one of those pipes leaking, and they have been subject to the extremes of weather, both hot and cold.

1611. *Chairman.*] What are your pipes?—Eighteen and twenty inches.

1612. What are they made of?—Iron; in the way I made pipes in the subway in Southwark-street.

1613. Mr. *Denison.*] You have not answered my question yet; what length of subway have you for those pipes in your works?—Very short indeed; some not more than 14 or 15 feet.

1614. But suppose a leak does take place somehow or other, now matter how, in these pipes in the subway, and suppose it goes on for a little time, you would not mind going in there with a lighted candle apparently?—Well I should not like to go in with a lighted candle if I was aware that the leak was going on.

1615. If you were not aware of any leak, of course you would not know that there was any danger?—I should enter the subway without any light at all. Let me tell you, for your information, that in 1864 I was in that subway, and there were two pipes laid down there in March. I entered that subway with lighted candles, and went fearlessly all over it.

1616. When the leak was going on?—Not while the leak was going on.

1617. That is what I put to you; suppose the leak was going on, and that you knew that it was going on, what steps would you have taken?—Then I would take a safety lamp, or adopt some mode rather than the naked candles, which I have been using.

1618. Supposing a leak was going on, and had been going on for some time, and a man went in carelessly with a candle, or a pot of melted lead, or a pipe, what would happen? — If it were an explosive mixture an explosion would follow.

1619. There are very wide limits for explosive mixtures of gas and atmospheric air, from 1 to 10 to 1 in 15, or 1 in 20?—There would be nothing dangerous up to 1 in 5; it would be dangerous at 1 in 9, and very dangerous at 1 in 10.

1620. You are speaking as the engineer of the Commercial Company. Have you any objection to take the risk of these things upon yourself?—Not the slightest in the world.

1621. And the Commercial Company have no objection, I presume?—Not the slightest.

1622. I know they do not petition against the Bill?—They do not petition.

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1623. They are the one company out of the 13 who do not fear this risk?—They do not fear this risk, I believe; I am not sure; I cannot tell you that.

1624. I will see how far you agree with Mr. Evans. Do you think that those who require us to go into this subway should bear the risk, if there is any, or not?—That is a question which I am not prepared to answer at all. I am here as the engineer, to state that I should be very glad to adopt subways all over my district; I only wish I could do so; I think it would be a great saving to the gas companies, because it would enable us to have a better inspection of pipes periodically; but as to the political view of the question, I do not go into that at all, nor have I studied it.

1625. You will not have to pay the Bill yourself?—Perhaps that is the reason I have not taken it into consideration.

1626. You laid these 18-inch pipes in. That is your son, is it not (*referring to the drawing*)?—I do not acknowledge that as my son.

1627. These are 18-inch pipes?—Yes.

1628. There are no water pipes in here?—None.

1629. That is an 18-inch pipe. A 48-inch pipe would be a biggish thing, unless that is exaggerated?—A 48-inch pipe would be very much larger than that.

1630. What is the height of your son?—That is not my son (*referring to the drawing*). That man seems to be about six feet high.

1631. Forty-eight inches would come to about there (*pointing*)?—Yes.

1632. When you get these things into the subway, do you expect that you will be able to get others laid at 5*s.* 3*d.* per yard?—It would take a larger space than those spaces which you see there (*referring to the drawing*).

1633. Have you considered this question. Supposing a subway is filled up for a great part of its floor with pipes, how would you manage to move along?—Very easily indeed. Those 18-inch pipes in there are 12 feet long, and we had no difficulty in getting into the subway.

1634. Supposing the subway has got a great deal of its space occupied with pipes of these sizes, and you want to put a very large one in, how are you to move it along?—There is no tramway there now, but it would be very easy to construct a tramway to move pipes along the bottom of it.

1635. The tramway must be in the nature of a platform?—No, a simple rail laid at the bottom of the tramway. It would take up about 4½ inches or 6 inches of space at the very outside.

1636. Are there to be pipes along the middle?—I do not know what there are to be; you are asking me some impossible thing. If you tell me what it is you want me to answer, I will tell you.

1637. You say there are to be two rails put down, here and there (*referring to the drawing*). You say it will occupy 5 or 6 inches in each place?—Yes.

1638. Then from here to here (*pointing to the drawing*) must be occupied by the rails?—There would still be space to move a large pipe in.

1639. But that must be occupied by the men, and not by the pipes?—You are supposing a case that I am not following you in. The rails I am speaking of would be similar to the size of the rails that you see on an ordinary railway.

1640. I put it to you that there would be two rails here (*pointing to the drawing*), and a space between them, and you tell me they must be kept clear from the pipe?—Yes, for working space.

1641. There must be space for a truck running along here to carry the pipe along?—Yes.

1642. Supposing there are service pipes going across from one side of the street to the other, as we have it admitted that there must be in some cases, how will that truck of pipes run along?—We take the service pipes under the gravel, or round over the top of the arch; some went under, and some went over.

1643. I am assuming the case of their being pipes from one side to the other, both water mains and gas mains; I want to know how you are to keep the middle clear for the truck to go along, or to run upon?—That is a very easy thing to do; a service water pipe or gas pipe might be laid on each side of the tunnel, and the service taken out along each side without interfering with the subway.

1644. I am not talking about that, I am talking about the service going from here over to there (*pointing to the drawing*), and that service going from here

over

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over to there, how do you get your access then?—Over the arch, or under the foundation.

1645. Then we have now got to this, that there are service pipes going up there (*pointing*)?—They might do that, or else go under the bottom; there is sufficient depth to make a sufficiently good service pipe under the subway.

1646. Then, in point of fact, the service pipes are not to go straight across, but they are taken either round here or under here?—That would be a very exaggerated sort of things; I do not see why you should take them across in that way, so as to make a sort of web of it.

1647. Suppose I want to make a communication with that water pipe to go in that direction, and with this gas pipe to go in that direction, how is that to be effected?—Do you mean from the gas service here (*referring to drawing*)?

1648. No, I do not?—You mean a branch going into another system?

1649. Yes?—Instead of making the service pipe simply for the service of that street, I should have a main much larger, so as to make a trunk at the same time.

1650. I am treating this as a side street; how would you join that main?—I do not see the necessity for it; if I want to get into a side street at right angles with that tunnel, and required a service pipe for the entire street at right angles, then I would make my service pipe into a trunk pipe; I should put a larger main.

1651. Suppose a large pipe here has to be connected with a large pipe in a cross street, how is that to be done?—If a large pipe were to be carried from this side to the other, then I would take a larger pipe over the circle of the arch to do so.

1652. So that the way in which streets are to be connected is by the mains going over in that direction?—That is not so; I saw in the evidence of last year that the Phœnix Company would require two service pipes, and a trunk pipe, instead of putting two service 10-inch pipe; I should put one up of 18 inches, and make that a service and a trunk pipe.

1653. That has nothing to do with my question?—I do not understand you; any practical man would understand me.

1654. Will you try to understand this; here (*referring to the drawing*) is a cross street; that cross street requires a large pipe; how are these two pipes to be connected?—If I were to have a subway to lay my pipe in, and I was the engineer of the gas company called upon to lay my pipe in that subway, then I would not provide for a pipe going there at all, but I would do as I said before, put in my service pipe a trunk pipe, and make my connection go at right angles.

1655. Mr. *Paull.*] What is a trunk pipe?—They are much larger than service pipes, for the purpose of supplying a district beyond the immediate district. If I were called upon to lay pipes in this subway, instead of having two 10-inch service pipes I should have one large trunk main, or a pipe conveying gas to a district further off. Instead of making that a service main, I would have a larger main, so as to serve the public, and to carry my gas to a further district.

1656. This pipe made as large as ever you like, is wanted to be connected with a pipe going along a cross street; how is that to be done?—In such a case as that I would take a branch over the top of the subway.

1656*. Then we come back to where we were 10 minutes ago; you say there is to be a large pipe, and no longer a service pipe, coming up here and coming down here (*referring to the drawing*); certainly for a water pipe there would be another thing going down there; has it occurred to you what sort of a job it would be to make a large join in that way?—It is quite a possible thing.

1657. Suppose the pipe is anything like the size you talk about, it would fill up a very large portion of this subway, would it not?—If you will put your question in a form that I can understand it, I will answer it. If you want some enormously large pipe coming to some other large pipe, I should not adopt that plan at all; I should adopt the other plan, which I have endeavoured to describe.

1658. Mr. *Jackson.*] You would have a trunk as well?—I should have a trunk sufficient to supply the immediate district, and a district further off.

1659. Mr. *Duff.*] What is the difference between a trunk and a main?—It is a technical term used by gas men to convey the idea that a trunk main is a main

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carrying a large supply of gas to a district further off than the immediate district.

1660. Mr. *Denison.*] You are asked what is the difference between a trunk and a main?—They are both mains.

1661. Supposing a main is in a cross street, which you wish to be connected with a main in a long street, how do you say that is to be done; by bending across there (*referring to the drawing*), or in some other way?—If I had committed the stupid act of not providing for it in the first place, then I should have laid it across the top of the subway, or under the ground, if I had sufficient depth.

1662. If you had committed the clever act of providing for it in the first place, how would you do it?—We should lay such mains as would be sufficient for all our purposes.

1663. Supposing you wished to connect a pipe in this street with a main in that street, how would you provide for it?—I should take it over the top of the arch, or if I had room I should take it below. If it was a small main I should carry it under or over, as the case might be; it would depend upon the size of the main.

1664. Now you said, or rather my learned friend said for you, that you have got the details of that 5 *s.* 3 *d.* per yard?—Yes.

1665. How do you get at your 5 *s.* 3 *d.*?—I beg your pardon, I find that it is 5 *s.* 3½ *d.*

[*The Witness then handed in the following Table:—*]

Diameter of Pipe, in Inches.	Labour.	Cartage.	Lead.	Yarn.	Fuel.	Light.	Lowering into Subway.	Cast-iron Chairs.	TOTAL.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
18 inches - -	29·4	7·21	13·72	2·72	0·43	0·75	1·8	7·5	63·53
9 „ - - -	10·1	2·40	6·86	1·36	0·23	0·25	0·33	8·0	29·53

1665*. This was an 18-inch main?—Yes.

Re-examined by Mr. *Rodwell.*

1666. My friend, Mr. Denison, has suggested a very complicated mode of dealing with the pipes?—I really could not understand what he meant.

1667. At all events he has put a most extreme case, and one which need not arise?—It would never arise.

1668. I presume if water pipes and gas pipes were on the other side, that there would be no necessity for having a communication through the subway at all?—Just so.

1669. It might be done with long cross pipes, and you could lay down these pipes; would there be any difficulty in serving that district?—Not much.

1670. With regard to these pipes that you spoke of having been laid for 13 years, and having shown no leakage, I presume they are in a worse condition, being exposed to the atmospheric influence, than if they were in a subway?—Very much indeed.

1671. Therefore the fact being that they showed no leakage during that time, *à fortiori*, it would be the case that if they showed no leakage when exposed to the atmosphere, they would be less likely to show leakage if they were protected in a subway?—That is entirely my conviction and experience.

Examined by the *Committee.*

1672. Mr. *Paull.*] I do not quite understand how these pipes are to be got at; if you had to carry two pipes along the outside of Parliament street, a gas pipe

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pipe on one side and a water pipe on the other side, and you desired to carry the gas main over Westminster Bridge and the water main down George-street, how would you construct the pipes in the subway?—I should take it in one of two ways. If I had sufficient room I should go along the bed of that tunnel; but if I was prevented by any obstruction, then I would go simply over it and dip to the other side, and then go along the bottom. I take it that when pipes were once laid in a subway, that the water companies and the gas companies would arrange between themselves how they should lay their pipes, and that arrangement might be such so as to meet all future contingencies. They might arrange not to have those difficulties which have been presented to me by Mr. Denison.

1673. *Chairman.*] Your company is the only company which does not petition against the Bill?—They neither petitioned in 1864, nor have they petitioned now.

1674. How long have they been established?—Twenty-five years.

1675. Then it is an old established company?—Yes; it is a very extensive company, perhaps about the largest in London. We supply a very large district.

1676. Mr. *Paull.*] What is the length of the subway?—The length of the subway in Southwark-street is about half a mile.

1677. What rent do you pay for the use of it?—We are not paying any rent at all. We have no mains in the subway for the supply of gas. The mains which I have been describing as having been laid in Southwark-street subway, were laid as an experiment to meet the contingency that seemed to arise in 1864 about getting so many mains in the subway.

1678. Have you then placed a gas main through the subway which does not serve any house?—It does not serve any house.

1679. That was an experiment?—Yes.

1680. Did you ask the permission of the Metropolitan Board of Works to try that experiment, or did they ask you to try it?—In 1864 I gave evidence strongly in favour of subways to lay gas pipes and water pipes in. I gave my evidence to that effect, but I was not enabled to say that I had had any experience at all. After giving my evidence, and after I had heard the evidence on the other side, I asked permission to lay down pipes in the subway in the ordinary way, or in any way that I thought proper myself. I undertook to lay them in the way that I should have laid them if the street had been completed.

1681. Do I understand that the main which would serve a portion of the new street has gone through the subway, but that when in the subway it does not serve any place?—Yes; there are two pipes now going through the subway, but we do not call them main pipes. These are 2-inch mains, and for five years they have lain along each side of the subway, and have supplied the public lamps, and the services are connected with them to supply private houses.

1682. Although they are not mains you have pipes through the subways?—Yes.

1683. What rent do you pay for that?—I am not connected with the Phœnix Gas Company, and I do not know whether they are paying any rent at all.

1684. Where is it that you have your pipes?—I have not got my pipes in any subway. I am now asking to lay my pipe in the subway, crossing the New Millwall Dock entrance.

1685. Have you not been telling us of your own experience of pipes laid in a subway?—In this subway.

1686. You did not lay them?—I did.

1687. I understood you to say that they belonged to the Phœnix Company?—Those are two small pipes laid in an angle of the subway on the ground. Those large pipes I laid in 1864, and again in March.

1688. Is that main a continuation of the main that serves the portion of the street at the two ends laid along the subway?—No, I think not. I think the Phœnix Company have laid their main in the roadway.

1689. I mean yours?—We have laid them just in the same position, in the same manner as they would be laid to supply a street in the district.

1690. Do you supply Stamford-street?—We do not. We are supplying the east end of London. I am connected with the Commercial Company.

1691. You have paid nothing for laying your pipes within this subway?—We have paid no rent; we have simply paid all the cost of the operation.

1692. Why have you put it there?—Simply as an experiment. Having heard

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heard the evidence that was given last year as to the difficulty that there would be in laying mains in subways, I requested permission to lay a certain number of pipes in the subway as an experiment just to prove that the thing could be done.

1693. Is it in your district?—No.

1694. How does your gas get into these pipes at all?—It is the gas of the Phœnix Gas Company that passes through these pipes.

1695. *Chairman.*] How are these pipes laid; are they on a support or are they laid on the bottom of the subway?—They are connected from the small pipes that I found in the subway supplying the street lamps. They lay in the same way on the ground.

1696. Is there any gravel?—There is a firm gravel bottom.

1697. Mr. *Paull.*] Do you know what rent the Phœnix Company pays?—I do not know anything of the arrangements with the Phœnix Company. I know the pipes merely supplied the street lamps, and I made use of them to supply the gas to the lamps.

[The Witness withdrew.

[Adjourned to To-morrow, at Twelve o'clock.

Thursday, 27th June 1867.

MEMBERS PRESENT:

Mr. Bagwell.
Mr. Duff.
Mr. Floyer.
Viscount Galway.
Mr. Grove.
Mr. Jackson.
Mr. Cornwall Legh.
Mr. Paull.
Mr. Tite.

WILLIAM TITE, Esq., in the Chair.

Frederick Marrable, Esq., called; Examined by Mr. *Rodwell*.

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1698. YOU are an Architect and Surveyor, and formerly were Superintending Architect to the Metropolitan Board of Works?—Yes.

1699. Were you connected with Mr. Bazalgette in preparing the original drawings for the subways?—I was.

1700. You heard the evidence that was given by Mr. Bramwell yesterday, and the evidence given also by Mr. Jones, the engineer to the Commercial Company?—Yes.

1701. Do you agree with the evidence which they gave, with regard not only to the desirability of using these subways for gas and water pipes, but also the ease with which operations can be carried on in those subways?—Entirely.

1702. Have you from time to time inspected those subways where pipes are now laid?—I have.

1703. When did you make your last inspection?—In Southwark-street on Monday, and in Covent Garden-street on Tuesday.

1704. You have always felt convinced that it was desirable to use those subways, as is proposed by this Bill?—Yes.

1705. Has your experience since 1864, and your recent examination, confirmed you in those views?—Entirely.

Cross-examined by Mr. *Burke*.

1706. Is your experience confined to the subways already existing?—Yes; to those in London, and those in Nottingham.

1707. That is all you know?—There is not much more to know.

1708. What has been the cost per yard of the subways?—A little more than 2 *l.* a foot, I think.

1709. What are the means of ventilation in the Covent Garden subway?—By vertical openings through the crown of the arch, which are covered with gratings lying flush with the pavement of the street.

1710. Do you mean the foot pavement, or the roadway?—The road pavement.

1711. Does not mud come down the gratings?—Practically, no.

1712. But do you mean that they are open gratings in the middle of the roadway?—Yes.

1713. How many are there?—In Covent Garden-street there are five in the whole length.

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1714. Are they sufficient to guard against the danger from any gas that by any possibility might accumulate ?—I believe that they would carry off any gas that might escape.

1715. I did not examine you at length, because I thought it unnecessary; I believe the question of ventilation was gone into by the witnesses to whom I have referred; do you agree with them as to the effect of the ventilation which has been adopted ?—Yes; both in principle and in practice.

1716. My learned friend put a very summary question to you, whether all you knew about this matter was what you had seen in the subways of London and Nottingham ?—Yes.

1717. In addition to your practical knowledge derived from that, you have studied this subject, and had the advantage of hearing the objections raised in 1864, and have judged for yourself by scientific experiments ?—Yes; I may mention that before these subways were carried out, the Metropolitan Board of Works were extremely anxious to obtain the best designs, and they offered large premiums for designs; there were more than 50 designs submitted; the Board in their wisdom would not allow me to compete, but they did me the honour of putting me on the Examination Committee.

1718. My learned friend has said that your knowledge is limited and confined to experience in these subways; you have thoroughly gone into the subject to inform yourself as to the safety and desirability of using them ?—Yes; I have.

1719. Mr. *Floyer*.] You have been acquainted with these two subways in Covent Garden and Southwark-street ever since they have been constructed ?—The drawings for the Covent Garden-street were made entirely under my superintendence.

1720. I am speaking of the state of the subways ever since they have been constructed. Have you known them from time to time; have you inspected any of the subways and seen the state of them ?—I had not been in the Covent Garden subway since 1864 till Tuesday last.

1721. Do you know practically, as a fact, whether or not any leakages have taken place during the time that the pipes have been laid in these subways requiring repair ?—When I first went into that subway, in 1864, I did discover a slight leakage, which I described in my evidence on that occasion; it was caused by extreme carelessness, from the manner in which the main had been tapped; a hole had been punched, not drilled, and the service pipe, I think, to one of the street lamps, had been merely thrust into the hole, and a little clay rammed round it with the fingers; and I did detect a slight escape of gas by the smell; and upon examination I found it to be the case; the pipe was not even screwed in; there was no thread on the pipe.

1722. *Chairman*.] You mean no screw ?—Yes; it was merely thrust into the hole, in what I call a very improper manner, and stuffed round with a bit of new clay.

1723. Mr. *Floyer*.] As far as you know, no other repairs have been necessary in these mains or pipes in these subways since they have been in their present place ?—I never heard of any; on Tuesday morning there was a leakage from a junction pipe in one of the water mains, a small service pipe, but that was entirely caused by the union joint not being screwed up; what is commonly known as the union joint, a brass ferule, which has two screws in it; a right and left hand screw, which brings the two pipes close together; that was not properly screwed up, and there was a dribble from that union joint.

1724. That was in relation to the service pipe, not in relation to the joint between the two mains ?—That was in the service pipe.

1725. Viscount *Galway*.] Would that have been avoided if there had been daily inspection ?—The pipe was exposed to view, and it only required a pair of forceps applied, and a turn of the wrist, to put it all right.

1726. Why was it not noticed as soon as the leakage began ?—I can only suppose that the workmen thought a little leakage of water of so slight importance that they had not paid attention to it at the time; that was the reason; it would not take three minutes to set it right.

1727. Mr. *Jackson*.] Do you think that the action of the water in the pipes had turned the screw ?—No.

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1728. *Chairman.*] Is there an inspection in that sewer?—I believe from time to time the Clerk of the Works goes down; he told me so; he happened to be there at the time I was there; he told me he was there frequently.

1729. Viscount *Galway.*] If those pipes are laid in the subway you would think a daily inspection necessary, would not you?—It would perhaps be wise as a matter of precaution, but hardly necessary. I believe that if the pipes were properly laid they would not be subject to any accident or danger.

1730. Mr. *Paull.*] Can you form an estimate of what quantity of water would dribble out in the course of an hour?—Something like, I suppose, about two quarts might have dribbled out of it; it was a mere dripping.

1731. In the case of gas, many thousand feet I presume, would have escaped out of such a hole in that time?—No; not in the course of an hour.

1732. It must have been a very much larger quantity, and very much more important than any leakage of water could have been, and more rapid?—From so small an orifice as that from which the water was escaping, a very small quantity of gas would have escaped in an hour, possibly not more than 50 or 60 feet, if so much.

[The Witness withdrew.

Mr. *Henry Edward Jones*, called; Examined by Mr. *Wilkinson.*

Mr. *H. E. Jones.*

1733. You are Engineer to the Wandsworth and Putney Gas Company, I believe?—I am.

1734. And you have been so for the last four years, I believe?—That is so.

1735. And for the last six years previously, you have been constantly occupied in the construction of gas works under Mr. Robert Jones, your father, who was a witness yesterday?—Quite so.

1736. Under the instructions of your father, you laid the services he described in the subway in Southwark-street?—I did.

1737. That picture on the drawing does not represent you; you did not sit for your portrait?—No.

Chairman.] Rather stood for it.

Mr. *Wilkinson.*] Stood for it; I stand corrected,

1738. Will you explain what you did by the direction of your father in the year 1864, having obtained permission of the Board of Works?—In 1864 we laid six lengths of three different sized pipes, one 18-inch diameter, one 10-inch diameter, and one 6-inch diameter, in the subway.

1739. *Chairman.*] In what subway?—In the Southwark-street subway, having previously taken the gas supply into the first pipe laid down from two small pipes, which were already in the subway for supplying the lamps in the street; we connected those two-inch and a-half pipes with the first pipe laid; we then stopped that supply of gas, by placing a bladder in each pipe, in the nature of a bag, and then bringing a fire pot, or fire devil, for melting the lead down into the subway, we laid the pipe in the ordinary manner in which they are now laid in the streets, simply keeping back the gas by means of a bladder; that was performed quite successfully, and afterwards three services were laid besides, a 2-inch service and a 1¾-inch were laid from one of the smaller pipes with the gas fully turned on, no attempt being made to keep back any that might escape.

1740. You say you also laid the services in?—Yes; we also laid three services.

1741. That was so far as the operations of 1864 were concerned?—That was so.

1742. In the month of March last, did you also superintend the laying of 144 yards each of 18-inch and 9-inch pipes in the same subway?—I did.

1743. The positions are shown faithfully in that diagram, are they not?—That diagram accurately represents the position of the pipes.

1744. Had you any difficulty in laying those pipes?—Not the least.

1745. I presume, in the course of carrying on those works, you must have sited the subway a very considerable number of times, of course?—Yes; something like 40 times while the work was going on, and since that time.

1746. The pipes at that time being laid and charged?—Yes. I may say that the pipes were laid by ordinary workmen, and no attempt has ever been made to go over them with a tool, after testing them; they are just as they were left from the tools of the men who set the pipes up originally.

1747. With the experience thus obtained, would you have any hesitation in carrying on the operations necessary to be performed with the gas mains used in the subways?—Not the slightest.

1748. I will just ask you, from your experience, to tell me what advantages do you consider to result from the laying of gas pipes in a subway; first of all with regard to the number of mains necessary?—I may say that I should consider that in a subway a less number of gas pipes will be necessary than in the street. My reason for saying so is, that in a wide street the trunk main is carried up the centre of the street, and to save the laying of service pipes all across the streets when they supply the houses, they find it better to lay a pipe along on each side of the street near the houses, so as to shorten the service pipes and lay them with greater facility.

1749. *Chairman.*] Those side pipes are supplied by the middle main, are they not?—Yes; they are supplied by the middle main.

1750. Mr. *Paull.*] What is the object of shortening the service pipes?—To reduce the expense of opening the pavement every time they lay a service, and also to reduce the leakage which is found now to occur principally from service pipes.

1751. That is so, that the leakage (I saw in one of the petitions) chiefly arises from the service pipes, and not from the mains; the longer the service pipe, the more chance of an escape, I suppose?—That would be so under the present condition of laying those services.

1752. *Chairman.*] It would not be in a subway, I presume?—No; not so in the subway, because the pipes, when laid, are perfectly protected from anything that can interfere with them.

1753. Mr. *Wilkinson.*] One of the circumstances which render necessary a multiplication of pipes, I think you said, in the ordinary cases, was to avoid the frequent disturbance of the streets, and the consequent expense attendant upon that?—That is so.

1754. As well as the danger from leakage?—As well as the danger from leakage from the long service pipes.

1755. And then, with regard to the inspection of mains and services, how is that?—When laid in the subway, they are open to any amount of inspection and testing; in the streets that is not so; the public would never tolerate such a length of open pipe; in consideration of public opinion, they could not keep a long length of pipe laid open to give themselves the proper time for thoroughly inspecting it and testing it; in the subway you may take your time, and apply any test you please; you can fill a pipe under a pressure of water, and test the whole of the pipes at one testing, with any pressure of gas or air, or take any possible means you please; you may take your time about it; further than that, it is much more easy to detect a smell or leak from which gas is escaping in the subway than it is in the open air; in the first place, the smell would be stronger in a subway, from its being to some extent confined; in the second place, when the pipes are tried with a light, a very small jet of gas, which will only burn with a blue flame, and would be quite invisible in the daylight, can be distinctly seen in a subway, as I have experienced myself.

1756. So far as the smell is concerned, a pipe being laid in the ordinary way will also be subject to the smell of the surrounding earth, which would render it more difficult to detect the precise point of escape?—Yes; that would be so undoubtedly.

1757. Now, let me direct your attention to the disturbing causes which are found to affect the services laid in the soil; vibration from the traffic, for instance?—I may say, when we lay pipes in the soil, whilst I believe it to be done in the first instance as perfectly sound and tight as the pipes I have laid in the subway, yet after that the tightness ceases by reason of the disturbing causes which accrue; in the first place from paving over them, the concussion of the paviour's rammer in solidifying the road over them, and putting down the pavement; and secondly, from the vibration of the heavy traffic over them, all of which they will be protected from in the subway; and also from the operations of other companies who are laying pipes near them, or forming a sewer or drain

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in the road, which causes a settlement of the earth, and a displacement of the pipes.

1758. Now, besides the causes which you have mentioned, have you in laying pipes in the ordinary way, found difficulty in laying them perfectly level and straight, in consequence of obstructions occasioned by other pipes, from the want of some uniform system of laying pipes down?—Yes; that is so; in laying a pipe along an ordinary street or road, we are continually coming foul of some other company's mains, or somebody's drain pipes; in the absence of the subway they are laid without any particular plan or system; they occur at all sorts of levels, and we are constantly called upon to come up or go down suddenly a few feet, and to make a very awkward bend sometimes, which renders necessary the use of a great number of syphons to carry away the condensed matter, which will be deposited in those bends; in the subway that is all different, there is an uniform system and, you know precisely what level you can go upon, and what obstructions you will have to meet with, in fact there are no obstructions.

1759. You have a pre-arranged system comprising all the levels that are necessary for the different services?—That is so; in laying pipes in the ordinary manner, I have frequently had to take up a number of pipes that I had laid down for some distance, to divert their position in order to clear some obstruction which I had not foreseen.

1760. Will you give the Committee the advantage of your experience, as to the cost of laying the mains?—I may say that, judging from the pipes we have laid in the Southwark-street subway, the cost is considerably less.

1761. There being, I suppose, less labour required?—It is principally in the labour required. It is self-evident that you have not to move such a great body of earth, nor yet to interfere with the paving.

1762. There is no fencing required round the trench nor any watching at night?—No.

1763. Again, there would be no interference by the weather?—No; and the operations could be continued in rain or snow or any other time, when ordinarily they would be stopped.

1764. Upon the question of leakage, have you made any experiments to test the pipes in the subways?—I have made several experiments with the pipes; in the first place I subjected them to a pressure of gas equal to 12 inches of water.

1765. That was by a special apparatus, and not by the company's mains?—That was by intervening a small gas holder.

1766. You are mentioning a pressure far exceeding the pressure in the company's mains, are you not?—Yes; four or five times as much.

1767. Will you give the result of that experiment?—At that time I found the gas holder full, showing a reduction of bulk equivalent to half a cubic foot per inch. That diminution of volume can be attributed to two or three causes. The experiments I made afterwards, which extended over many weeks, convinced me that no part of that could be attributed to what is ordinarily called leakage.

1768. To what do you attribute it?—In the first place, the pipes that I used were new ones, and there would be in the first place an absorption, or what is called, I believe, by chemists, an imbibition, of any oily vapours; any vapours of hydro-carbon in the gas by the internal surface of the pipes.

1769. That imbibition of oily vapours you mention as one cause, is there any other cause?—Condensation would account for the further disappearance of bulk.

1770. The condensation would produce liquid matters which are pumped out by syphons?—Which are pumped out by syphons; the gas at all times holds more or less vapour of water in suspension, however well it may be condensed at the works, it always holds a greater or less quantity of the vapour of water in suspension, as well as hydro-carbon oils, which will afterwards be condensed in the mains.

1771. I understand you to say, from the result of your experience, that the disappearance of the volume of gas was not caused by the leakage but by the condensation and by this imbibition of the oily vapours?—Yes; I may say before leaving the subject that I found the gas in the pipes fall to a pressure below that of the external atmosphere; in other words, that the gauge which you had explained to you the other day, stood reversed, showing what I should call a vacuum or

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or a negative pressure inside the pipes. Noticing that, it occurred to me that whilst I could not separate accurately and exactly what the amount of condensation would be, or imbibition, still the fact that there could be a vacuum in the pipes showed clearly that there could be nothing like a mechanical orifice or leakage of any kind whatever throughout the whole extent of it.

1772. Mr. *Floyer.*] What was the extent, in length, of the pipe upon which you experimented?—It was 144 yards in length, and 18 inches in diameter, and the same length of a 9-inch diameter pipe: I purposely allowed the gas to fall to a vaccuum, shutting off all communication, both with the gas holder and with the supply of gas; and I left the pipes in that condition for five or six weeks, visiting them daily to ascertain what was the amount of vacuum in them; and for the whole of that six weeks I found the vacuum varying, averaging 35-10ths of an inch; at the end of that time I opened a communication to the external air through that small jet, which has a round hole of the 50th of an inch in diameter, and that small jet reduced the vacuum to 4-10ths of an inch in 48 minutes; then putting in this small burner, which is an ordinary five-foot an hour gas burner, the vacuum fell to zero, and remained at zero, in 52 minutes, showing clearly that as this burner would, at that time pass, I suppose, six cubic feet of air into the pipe, that a hole of that dimension would have stopped my experiment on the first day.

1773. Viscount *Galway.*] What was the size of the hole?—The hole was about the 50th of an inch; the hole was one which, under ordinary circumstances, would burn about one cubic foot of gas per hour; it is an ordinary burner, such as is sometimes generally used.

1774. *Chairman.*] You mean to infer, from this, that there was no escape that would interfere with your experiments?—Yes; that there was no leakage, and that is further proved by the fact that, whilst the pipes were under pressure, I went along them from end to end with a lighted candle, to all the joints, and I could not see the faintest glimmer of blue light, nor was there any smell of gas in the subway.

1775. Viscount *Galway.*] How long have they been down without repair?—Some eight or nine weeks; they were laid on the 14th of March, so that they had been down some eight or ten weeks.

1776. Mr. *Jackson.*] Had the pressure been upon them all that time?—For six weeks I had a vacuum in the pipes, and for the last three or four weeks they have been under the ordinary pressure of the companies' supply. I should like to explain before going further that these pipes were laid under another disadvantage. It is the custom to put an inch and a half of lead into the socket of the pipes.

1777. With an 18-inch main?—Yes; with an 18-inch main, or even smaller sizes; I only put three-quarters of an inch depth in this particular pipe.

1778. *Chairman.*] You put spun yarn in, or whatever it was?—I filled up the difference with spun yarn.

1779. Mr. *Wilkinson.*] That is not the mode in which you would now construct your joints, would you?—No; it was robbing them of so much extra tightness, if I may so call it.

1780. And so much provision against the expansion and contraction of the pipe?—I may say, to meet the question of expansion and contraction, which I believe to be quite unfounded in my experience, some of these joints were made elastic, without metallic lead entirely; the joint was made an elastic one, by simply packing into it spun yarn saturated with a mixture of oil and ordinary red lead.

1781. One word as to ventilation; do you think that the ventilation in that subway is sufficient?—I consider that the ventilation is quite sufficient for all practical purposes.

1782. And with respect to light?—The men, I may say, made no objection to work; in fact, they made a day and a half time while they were down there; we were in a hurry to complete the pipes, and the men every day worked a day and a half, and had their meals down there, and frequently never saw daylight from six in the morning till ten o'clock at night.

1783. Viscount *Galway.*] Did you let them smoke at their dinner?—They did what they liked.

1784. Should you have been afraid of their smoking?—Not the least; we had naked candles all about all the time.

1785. Mr. *Wilkinson.*] Your father, when he was examined, gave us an estimate of the cost of the saving in the larger pipes; you know the statement he gave in, I presume?—I do.

1786. Do you confirm that?—I differ from him in one item, and that is as to the estimated cost of the supports for the pipes; he took the cost of a support for an 18-inch pipe.

1787. Is that a cast-iron chair?—Yes; a cast-iron chair; he takes it at 7 *d.* a yard run.

1788. Sevenpence and five decimals?—I make the cost of the cast-iron chair or brick pier in the subway, to be about 1 *s.* 3 *d* a yard run.

1789. That amount would be an addition to his estimate?—Yes

1790. Subject to this, do you confirm the other items?—I do; we have found the greatest facility in laying the pipes with fewer labourers than we generally employ to lay such pipes; the jointers could not get on quick enough, and I had to dismiss some of the labourers from their work; they had to put the pipes from the waggon down into the subway, and into their places, as it was done quicker than the jointers could keep up with them, and there were only six labourers employed.

1791. One word with reference to the brick piers; on what items do you base your estimate of 1 *s.* 3 *d.* as opposed to 7 *d.*; how many cubic feet do you think would be requisite?—I make each pier contain six cubic feet of brickwork.

1792. Have you measured it?—No; I have not done so; I saw some piers down there, but I did not measure them.

1793. Are you aware that in the construction of those actual piers 250 bricks suffice to make six piers?—I could believe that possible; I have taken the outside.

1794. If that be the case, would it in any way vary your idea as to the estimate of 1 *s.* 3 *d.*; that would give you three cubic feet per pier, would not it?—I think it would do so.

1795. That being so, of course reduces your estimate proportionately, which you tell me was based upon the idea that six cubic feet would be required?—Yes.

1796. Are you aware that one chair or pier supports three pipes?—Yes; that is so; one chair or pier supports three pipes.

1797. Those facts being brought under your notice, do you still think your father's estimate of 7 *d.* decimal 5 is too low?—I should not like to say that it was; I estimated at a size that would satisfy any of the objectors.

1798. Do you find in actual practice that a very much less size is sufficient?—A very much less size is found sufficient; in fact, I might say that six bricks would support them.

1799. That of course would lessen the expense still further?—It would.

1800. I do not know whether you have had any experience with regard to water pipes?—No; I have not.

1801. Is there any other fact connected with your experience in gas pipes which you would like to mention to the Committee?—Only one, as to the objection of the water companies to let their pipes come near to those of the gas companies. The district company which I serve is that of Wandsworth, and over the bridge in Wandsworth high street, crossing the Wandle, one of the water companies, whether it was the Southwark and Vauxhall, or the Lambeth Water Company, I am not prepared to say, we discovered had shifted one of our pipes, crossing this bridge, a little out of its place, and carried their water pipe directly under it, and parallel with it for some 30 or 40 feet.

1802. Without your knowing it?—Without our knowing it at all. When we came to open the ground to look at our pipe we found in its place a large water pipe, and following round we found our own pipe lying close upon it; the space was contracted, and it had evidently been shifted without our knowledge, and the other pipe put in its place.

1803. Mr. *Paull.*] Where was the gas during all those movements of the pipes?—The pipes would bear a certain amount of displacement without losing very much gas; they would leak undoubtedly, and the joints would require to be set up, but assuming some two or a dozen joints in a length of pipe, you could divert the centre of it some considerable distance, which would have the effect of lengthening the whole distance of pipe, partly drawing them out of their sockets

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sockets to accommodate themselves to the curve, which would require that the joints should be set up and remade.

1804. Viscount *Galway.*] The pipes were then both covered with earth?—The pipes were then both covered with earth.

1805. *Chairman.*] What do you infer from that?—I infer from that that a water company has not much objection to its pipes going near to a gas company's pipe, when it suits their interest to do so.

1806. Mr. *Wilkinson.*] You also refer to that as an illustration of the inconvenience which you suggested before, from want of a pre-arranged system of laying pipes crossing each other?—Certainly; I have no objection to a water pipe coming as near as it likes.

1807. Observations have been made in this room, as to the difficulty of crossing the pipes in the subway; has your attention been directed to that?—There is no mechanical difficulty whatever in getting in and arranging our pipes in those subways; yesterday afternoon after leaving this place, I had a conversation with some gas engineers, and they are prepared to admit that no mechanical difficulty exits which cannot be got over.

1808. Have you any experience to offer to the Committee, as an illustration with reference to Westminster Bridge, and the mode in which the pipes there were taken over?—I may say, generally, that we can have a gas pipe that need not be round; it can be oblong or oval, or flat, or any other shape, so long as the sectional area is the same; over Westminster Bridge there is a flat pipe of only 6 inches one way, and something like 24 inches the other, the sketches for which I made some years ago for the London Gas Company; using a pipe of that sort you could get underneath a cross pipe; if I took a junction from a pipe on the left hand side, and wanted to go down the street on the right hand side, I should put a flat main in underneath the pipe on the right hand side, and bring it up when I get beyond it; there is no mechanical difficulty whatever.

Cross-examined by Mr. *Richards.*

1809. You as an engineer, I understand have no objection to water pipes coming near to your gas pipes?—Not the slightest.

1810. No gas engineer I suppose ever has, has he?—I do not see any reason why he should.

1811. The water engineer rather objects to the gas coming near his pipes?—Yes; he does, and reasonably, under the present system.

1812. You told us a story about a water company; you did not exactly seem to know what company, but some water company moving your gas pipe; what has that to do with the question of subways, I do not see the application?—Simply I have heard it stated in this room, or rather inferred, that if the mains or the service pipes of the water company happened to go across the gas main to the other side, that there would be a dreadful contamination of the water?

1813. The case you refer to was over a bridge?—Over a bridge.

1814. You would hardly contemplate having a subway in that case?—No; but there were other means of getting their pipe down if they objected to that.

1815. Again I must ask you, you told us a good deal about a vacuum in the pipe, or the pressure you put, what has that to do with the subway question?—It simply shows that pipes laid in the ordinary manner in subways have not got any leakage upon them.

1816. You laid about 144 yards you say?—Yes.

1817. Would there be any difficulty in laying 144 yards in the ordinary way, by a trench in the street, and at the end of eight months, finding them quite perfect in their joints in every respect?—I think there would be the greatest difficulty if you permit people to pass over it, and the ordinary traffic of the streets is to pass over it.

1818. You mean to say, that in your opinion as a gas engineer, that there is a leakage takes place in most pipes when they have been laid down eight or ten months?—I think so; I think any gas engineer will tell you that however perfectly tight you make your pipes, and however carefully you put them in the soil, they do not continue in that state for more than 24 hours at the outside.

1819. That is what you say?—Yes.

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1820. That, I suppose, is what is the case with the commercial pipes?—Undoubtedly.

1821. You tried your experiment upon 144 yards; was that of different sized mains?—It was 144 yards of each size, an 18-inch, and a 9-inch.

1822. I suppose I am not wrong in saying that the gas mains in London amount to thousands of miles; do not they?—They do.

1823. The conclusion you wish us to draw is, from an experiment practised upon 144 yards of those four lengths of main at the end of eight months?—That is so.

1824. Were there any services connected with them?—We have connected services with them.

1825. Before the experiment, or is that part of your experiment?—The gas was supplied from one pipe to the other, through the services.

1826. Were there any other pipes in the subway at the time that you laid them in there, except one little one, the 3-inch pipe?—No; there were not.

1827. Therefore you laid them in the subway, under the most advantageous circumstances?—Decidedly; just the circumstances under which any gas company, who were told to put their gas pipes into a subway would have laid them.

1828. Do not you admit that, if there were already four or five pipes in a subway, there would be a great difficulty in putting in a sixth or a seventh?—Not if the intermediate space of three feet, such as is now in between the pipes, was left clear.

1829. But suppose, instead of having a couple of 18-inch pipes, and a couple of 9-inch pipes, you had a couple of 18-inch pipes and a couple of 36-inch pipes?—Then they simply could not be got into the subway; the cubical capacity would not hold them.

1830. It is obvious that, if you had a subway tolerably filled with pipes, the difficulty of laying additional pipes would be very much enhanced?—Not with pipes which are of the necessary size; of course, if you ask for a 6-feet main for that subway, I should tell you that it was impossible to put it in.

1831. I did not ask you as to a 6-foot main, I said a 3-foot main, or 36-inch main?—A 3-foot main is not necessary in that street.

1832. But it may become necessary, of course, in any other street, may it not?—I cannot conceive that a 36-inch main would be necessary, but if a 36-inch main were necessary, I could put one into that subway, and yet leave the centre free.

1833. You know there are 36-inch mains in London, both for water and gas?—There are, but they are quite exceptional, they are only principal leading mains, gas and water mains.

1834. Do not you know that the City of London Company themselves last year asked for two 42-inch mains?—Very probably, and if they wanted to run them through a street, I have no doubt that they would build a subway to accommodate them.

1835. You conceive that the risk of accident is very much reduced by the use of subways?—I do; most emphatically I consider that the chance of accident is reduced by the use of a subway.

1836. Giving you the benefit of your emphatical, I suppose you will admit that accidents will happen even in the best regulated subways, or may happen?—What sort of accident do you refer to?

1837 Of course I speak of accedents occurring by explosions, that a leakage may take place, or injury be done to the pipes and the gas escape?—Not with proper care.

1838. Not with proper care; but accidents may happen, may they not, in the subways?—They may happen, and so they may happen in the streets at the present moment.

1839. If they did happen, do you not think that the result would be far more disastrous than it could be at the present moment by pipes laid in the earth?—I am not prepared to say what they would be; I think that is all problematical as to what the force of an explosion would be in a subway, whether it would be 50 or 100 lbs. I am not prepared to say, or to dwell upon it for a moment; but I do say that escapes which lead to accidents can be altogether stopped and done away with by the use of a subway.

1840. Do

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1840. Do I understand you to say that it is practically impossible that an accident can occur in a subway?—With the amount of care and precaution which should obtain.

1841. I understand you to say that the leakage would be very much diminished in consequence of there being no vibration; you are aware, of course, that the water pipes in Paris are laid in the sewers?—I have heard so.

1842. Did you hear Mr. Belgrand say, when he was examined in 1864, at Question 4679, "In like manner the shaking produced by carriages affects the water pipes; we have conveyed a great length of water pipes in the sewers, and we have leakage in those water pipes which are conveyed into the sewers"?—

1843. *Chairman.*] Did you hear Mr. Belgrand say that?—To answer your question, I may say that I was in the room when Mr. Belgrand was examined, and not being a very good Frenchman, I must say that I, like most others who were present, got into a little fog about Mr. Belgrand's evidence.

1844. Mr. *Richards.*] The answer is that you did hear him, but you did not understand him?—That is it; but taking it that he did say what you say, I say it is not a parallel case, because these are not sewers with water pipes in them, but properly constructed subways.

1845. Does not M. Belgrand's answer show that the vibration in Paris is sufficient to produce leakage in the water pipes which are laid in the sewers?—In the sewers.

Mr. *Rodwell.*] I do not think that is quite the effect of his evidence if you turn to it.

Mr. *Richards*] I have read the very words in Question 4679; the question put to M. Belgrand is this; "Do you think that the placing of gas pipes into a subway would entirely prevent the leakage which at present takes place in gas pipes?"

1846. *Chairman.*] It is suggested that the witness does not understand the question?—I understand the question, but I did not understand M. Belgrand's evidence.

1847. Mr. *Richards.*] The question asked him was, "Do you think that the placing of gas pipes into a subway would entirely prevent the leakage which at present takes place in gas pipes?—Certainly not; and these are my reasons for saying so; it is certain that the shaking occasioned by the carriages is one of the principal causes of the leakage; but there are streets in Paris where, so to speak, no carriages pass, and where the ground is never affected by gas pipes; I name principally in this case the Rue Racine; in like manner the shaking produced by carriages affects the water pipes; we have conveyed a great length of water pipes in the sewers, and we have leakage in those water pipes, which are conveyed into the sewers;" you heard him say that, but you did not understand him?—Just so.

Re-examined by Mr. *Rodwell.*

1848. Do you happen to know that the water pipes in Paris are fixed to the walls, and not laid upon a bed in subways, as we propose to do here?—I have seen sketches of them.

1849. My learned friend asks you whether you are satisfied from your experiments upon the 144 yards of pipe; I understand you to say that if 144 yards of gas piping were laid as at present, in the earth, in the ordinary way, that it would at the end of eight months present a different appearance to a gas pipe which had been laid in a subway for that period?—Entirely.

1850. Although you have only experimented upon that distance, are you satisfied in your own mind that what is true of 144 yards would be true of a longer distance?—Yes; of 144 miles, undoubtedly.

1851. I understand you also to say that the difference at the end of that period arises from the fact of the one being subject to vibration, and the other lying in a state of quiet?—Quite so.

1852. My learned friend professed not to know what was the object of your stating that the water companies had laid their pipes in close proximity to your gas pipes; the point, I presume, is this, that if they had thought the water would have been contaminated they would not have done so?—I should say not.

1853. Therefore, if there were anything in the objection that the gas would contaminate the water in the subways, the putting the water pipe in the soil in close proximity to the gas pipe, which you describe, would be a stronger case——

1854. But they had no scruples to do that, and they did it without your knowledge ?—Yes.

1855. My learned friend asked whether those experiments and observations of yours were not made in the subways under the most advantageous circumstances; were there any advantages which the company could not avail themselves of if they were disposed to use these subways ?—Not the slightest.

1856. Of course, if you are to try to introduce pipes larger than the dimensions of the present subway will allow, that would be impossible ?—Just so.

1857. Of course my learned friend can go on suggesting pipes of whatever size he likes, larger than the capacity of the subway, in order to show that it is impossible to introduce them ?—Certainly.

1858. With reference to the existing subways in the streets that have been authorised; is the capacity of the subway sufficient for all the present and probable wants of the districts ?—Yes ; if we are to judge from the evidence of the gas company's engineer two years ago.

1859. Mr. *Cornwall Legh.*] I understood you to make some distinction in reference to filling up the joints ; you said that you filled up some of the joints with molten lead, and others with red lead, and stuffing in the usual way ; which do you consider the most effectual ?—I am not prepared to say which, so far as I have been able to see from these experiments, the one which I should say can be put without being anything like so expensive, is the hemp packing saturated with red lead ; it is much less expensive than the other, and it is not necessary to have a fire or anything of that sort, and the expense of fuel going on, it does not cost so much as the metallic lead.

1860. Your answer exactly meets what I was going to ask you, it is a matter of saving of expense, but it is also a matter of some convenience, not being obliged to have any fire in the subway, you do not require any fire in the one case and you do require a fire in some degree in the other ?—That is so.

1861. Mr. *Paull.*] How many side passages are there to be in the subways, is there one to each house ?—One side passage accommodates two houses, that is to say, the partition wall of the cellar of the house, comes in the middle of the side passage.

1862. So that you would be able to reach one cellar to the right, so to speak, and one to the left ?—Yes.

1863. Then the side passages would come up to the cellar wall ?—That is so.

1864. Is a communication to be made between the cellar and the passages by a door ?—No.

1865. The gas pipes would be carried through the wall ?—Through the wall.

1866. Having passed through the wall, supposing it reaches the coal cellar, how would you carry it ?—Carry it through the coal cellar, just as we carry the services at the present time through the cellar of the houses.

1867. Up, so to speak, along the arch of the cellar ?—Yes ; along the ceiling.

1868. At present, I believe, the house services, and the street lamp services, pass under the pavement between the arch of the cellars and the base of the pavement ?—I think they do, because the gas company's main is not in the subway.

1869. I mean as the mains or pipes are now laid, the house services, and street lamp services, pass immediately below the kerb stone ; the pavement stone ?—Yes.

1870. How do you propose with the street lamps to carry up the services ; will you be kind enough to look at that diagram, and point out to me where that would be ?—I will.

1871. *Chairman.*] In Garrick-street, it is done, and it is done in Southwark-street already ?—The small pipe from the meter which supplies the public lamps in Southwark-street, runs along to the angle of the subway, and the service to the lamps is carried along the side passage, and up the wall of the cellar.

1872. Mr. *Paull.*] Inside the wall, or outside ?—The subway side of the wall; a cast-iron

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a cast-iron pipe is then put in from the surface downwards to the side passage; the small pipe runs along from that point, and so to the lamps (*describing the same*).

1873. Supposing the lamp post to be knocked over by a heavy cart as we have sometimes seen; or the service pipe strained or broken below the kerbstone, or below the roadway, how would you reach it, would not you have to break up the roadway, and break through the concrete, and so all the way down?—No; because the wrought-iron pipe comes right through.

1874. I presume the service pipe is to go within that iron pipe?—Yes.

1875. If the service pipe were broken, you would be able to reach it through that with facility?—Yes.

1876. That would hardly be the case if the service pipe should happen to be broken deep through the pipe?—Suppose the service pipe were broken off here, it would then be necessary to go down into the subway to repair it.

1877. Then must not you break through the top of the subway, and through the soil above the subway, so as to be able to reach that pipe?—No; because the service pipe passes through. It is a 6-inch cast-iron pipe, which allows of a space all round it.

1878. You apprehend, as a gas engineer, no difficulty in repairing any breakage that may occur in the public lamps?—I perceive no difficulty.

1879. In the same way you see no difficulty in any repair that may be required in passing through the cellars?—Certainly not; the pipe in the cellar is in no more dangerous position than it would be in the cellar at present.

1880. With regard to the subway itself; supposing an 18-inch gas main to have been sufficient to supply the wants of the streets at the time it was laid down, and supposing water pipes and other pipes had been laid round it, and supposing it became necessary to put in a 30-inch main, how would you propose to deal with the water pipes or any other pipes that might have grown round about that 18-inch main. I apprehend they must all be removed from their resting places to admit of a larger main being placed; is not that so?—I think not; supposing the pipes are in the position in which they are now shown, and it is found necessary to substitute a 30-inch gas pipe for this 18-inch gas pipe, I would carry the chair a little higher, and put the 30-inch main in its place.

1881. You are now supposing only small pipes, like those shown on the map, but supposing a water pipe of equal dimension to the 18-inch gas pipe to have been placed side by side with it?—That I am supposing to be on the side of the subway.

1882. But supposing each side of the subway, as is represented here, to have had an 18 inch pipe placed, and then subsequently the other pipes to have grown round it, how would you contrive to displace those pipes in order to admit of the 30-inch pipe being placed?—What other pipes do you refer to as having grown up round this pipe?

1883. You see in the Bill there are the words "other pipes," water pipes, it is impossible to say what other pipes there may be. The question I ask you is this, supposing the subway to have got new pipes placed in it for whatever purpose it may be, how would you shift them to admit of a larger service pipe, either for gas or water, that would be a practical difficulty, would it not?—I may say that the pipes so arranged are all that I can conceive, that the gas company or water company would require to have there; it is highly objectionable to a gas company to multiply its mains or to have any more mains than it is absolutely necessary for its purposes; how it could arise that there should be other pipes growing around this I cannot conceive.

1884. Why are there represented side by side on each side there?—Because they are the largest quantity of pipes that we could learn by the evidence, on the last occasion, could be required in Southwark-street.

1885. Supposing that the two smaller pipes, now, were originally laid on the same side as the large one, and it became necessary to increase the size of the large one, as it is now represented, from 18 inches to 30 inches, how would you deal with the two lateral pipes?—It simply could not be done in that subway.

1886. That is a practical difficulty, is it not?—If you wanted such an extra number of pipes, the subway would, I apprehend, be constructed to accommodate them.

1887. Supposing such a state of things occurred that a water pipe were laid by the side of a gas pipe, and, in either case, it became necessary to increase the size

size of the main, at whose expense ought that to be done; supposing one main to be removed in order to introduce a larger one?—It should be done, clearly, at the expense of the parties who benefit by the alteration.

1888. So that the water company would have to bear its own expenses, and also the gas company's expenses, and *vice versâ*?—If the water company find that they get the advantage of selling more water by putting a larger pipe in the place of the smaller one, that is precisely an analogous state of affairs to what we find at the present time, they have to bear the expenses.

1889. This points to the question of arbitration; it must necessarily be the case that one company, who disturbs the pipes of another company, must bear their expenses as well as its own?—Decidedly, should such be found necessary.

1890. I do not think this question has been asked before; supposing the sewer, which you observe under there, were to require repair, how is it to be reached?—There is ample space in the width between the pipes to take the whole sewer out, and even to put a larger one in.

1891. The concrete on the floor of the subway, which is to be put there, as you probably know, would have to be broken up?—That concrete would only be some two or three inches deep, perhaps.

1892. But nevertheless the concrete would have to be broken up, and possibly the pipes removed, in order to reach and to execute repairs that might be necessary in the sewer?—The pipes would not require to be moved, though the concrete would require to be broken; but that would be a quicker and less expensive operation than taking up the granite pitching and concrete and digging up the soil, such as is necessary at present, supposing a similar emergency to arise under the present system.

1893. I presume that if any damage should arise to the pipes, either the gas or the water pipes, then that ought to fall upon those who interfere with the sewers?—Certainly, if in interfering with the sewer they should directly damage the companies' pipes.

1894. If escapes of gas or water should take place, and accidents follow, would it not be for those interfering with the sewer to bear them?—Undoubtedly, I think so.

1895. Do you know, as a matter of fact, what is the inspection that takes place in those subways now; are watchmen kept there day and night?—No; certainly not.

1896. What officer has the Metropolitan Board of Works within the subway?—No officer whatever within the subway; I believe it is occasionally visited by their servants.

1897. When you say "occasionally," is that once a day or once a week?—I really am not prepared to say.

1898. Then, in fact, as a rule, both day and night, the subway is left unguarded?—It is so at present left unguarded for the night, I believe, and I should have no hesitation in leaving it for 12 hours.

1899. Does it occur to you that one of the gratings might be prised and persons drop through the shaft?—It is a very heavy and substantial grating, with a flange upon the lower part of it, which is partly covered by the granite pitching, they would have to disturb the paving before they could get the grating up.

1900. That is not shown there; the grating would be upon the surface of the street?—The grating has a flange here, upon which the surrounding paving-stones rest, and it becomes part and parcel of the whole pavement.

1901. But still it would depend upon the appliances which were used, whether that grating could be lifted up or not?—Decidedly it would.

1902. If a sufficiently strong lever was used, it could be got up?—Yes.

1903. And, under the present system of inspection, anybody dropping might rove about in the subway for some days, according to your account?—Yes; but I imagined the police in the streets, or persons driving, would very soon discover the hole.

1904. I take it that there would be quite time enough to pass along one of those side passages, and back into a cellar?—There might to be time to do that; but whoever was in the subway would be trapped as completely as possible.

1905. But

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1905. But he would get out the same way as he got in, would not he?—Not if there was a policeman standing at the top of the hole.

1906. Viscount *Galway.*] Of course a subway can only hold a certain amount of pipe?—That is all.

1907. I should like to know who is to decide as to the requisite sized pipe: supposing a water or gas company came and said that they wanted a 50-inch pipe; I want to know who is to decide the question as to the size of the pipe required?—I should say, decidedly the arbitrator between the companies and the Metropolitan Board of Works.

1908. Is there any such provision in the Bill?—

Mr. *Rodwell.*] I do not know whether there is a provision exactly meeting the points that you have raised.

Mr. *Richards.*] The Board of Works are to admit them as far as they can.

Mr. *Rodwell.*] The Board of Works are to admit them as far as they can, and, therefore, unless there were not room the case could hardly arise. The Metropolitan Board of Works would say there is not room, and they would have to go outside. There is no provision in the Bill for that specific point you have raised.

Mr. *Jackson.*] Is there any provision in the Bill, Mr. Rodwell, for throwing the responsibility upon the gas or water companies, or the Metropolitan Board of Works, to keep a good watch?

Mr. *Rodwell.*] There is no provision in this Bill as it stands on the face of it for providing for that.

Mr. *Jackson.*] As the evidence goes so far, it appears to me pretty clear that there ought to be a provision to say who shall have the superintendence of those subways.

Mr. *Rodwell.*] It would be, to a certain extent, a matter of detail to be dealt with hereafter. Of course that would depend a great deal upon the effect of the evidence given here; but it is a matter of detail, which may be dealt with any period hereafter.

Viscount *Galway.*] I suppose any person who damaged the pipes would be liable under the General Act?

Mr. *Rodwell.*] Probably under the general powers of the Metropolitan Board. With regard to all those police arrangements, there would be no possible difficulty in dealing with that question by the Acts in force at present. Probably there would be some provision in this Bill, or power to make bye-laws, and so on.

Mr. *Jackson.*] I think the Committee should have before them some information as to what is to be done with the subways when the pipes are laid; who is to have the charge of them, and who is to be at the cost of inspecting the pipes; and the question will arise, supposing any damage does accrue, who is to be responsible.

Mr. *Rodwell.*] From the mode in which this Bill has been opposed, and from the various assuptions and suggestions that are made by our opponents, it is extremely probable that anything that we put in dealing with that question would have been at once objected to, and therefore it is very difficult for us at this stage of the case to know how to deal with it, because we do not know what my learned friend's view of this part of the case may be.

Mr. *Jackson.*] You wish the Committee to deal with it.

Mr. *Rodwell.*] We could deal with the question after the preamble.

Chairman.] Do you mean this; that if we pass the preamble you would be prepared to propose a clause with reference to the points to which the Honourable Member has referred.

Mr. *Rodwell.*] No doubt.

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Mr. *Cornwall Legh.*] I must go still further than that. In order that we should pass the preamble, we should have those clauses in some way, to show us what would be done. If we pass the preamble there is an end of it; it may make to some of us a great difference in the views we take.

Chairman. I apprehend your friend, Mr. Richards, will want to be heard upon the preamble.

Mr. *Richards.*] I shall have a great deal to say upon that. I quite agree with the honourable gentleman, that if any other clauses are to be introduced, it is just as well that we should know what they are.

Mr. *Cornwall Legh.*] I do not want to throw any difficulty in the way of counsel, but according to my little experience where clauses to carry out engagements are made between two counsel, they are simply done after the preamble is passed, but if there are clauses that might affect the decision of the Committee, then I think an intimation of what the views of the promoters of the Bill are should be given to the Committee before they are called upon to decide upon the preamble.

Mr. *Rodwell.*] I quite understand what the Honourable Member states, but we have been rather in this difficulty; this is a large committee, not an ordinary private committee, dealing with a Railway Bill, and as we go on we can only ascertain the individual feelings of the Members of the Committee. Of course we do not know what the ultimate decision of the Committee may be upon this point, and therefore we think it at present unnecessary to enter into this question; it is a matter which sooner or later we must deal with, but I think in our discretion we will deal with it at a subsequent period. I do not know what the evidence will be that is to be produced by my learned friends on the other side.

Mr. *Jackson.*] Understand distinctly from me, that I do not express any opinion. I merely put these three questions to the parties, but I express no opinion.

Mr. *Cornwall Legh.*] I do not wish to be taken as expressing any opinion.

Mr. *Bagwell.*] I think if we decide upon the preamble, either for or against, then it will be the time for us to see that such clauses are introduced as we may think necessary to make the Bill perfect; we are perfectly competent to do that, as we should be under an ordinary Railway Bill. When we decide upon the preamble, then we, of course, can decide that such clauses should be introduced into the Bill as we consider necessary for carrying out the preamble, and carrying it out properly and legally, and seeing that neither public nor private interests shall suffer; we are perfectly competent to do that.

Mr *Rodwell.*] In promoting this case, we feel very much in the hands of the Committee, and we feel in a different position from what we do when we advocate an ordinary private Bill; probably, if you choose to pass the preamble of the Bill, you would accompany it with some resolution expressing the views of the majority of the Committee as to some provisions which ought to be introduced into the preamble; passing the preamble of the Bill subject to them, or something of that sort; that is the way in which we, in our conduct of the case throughout, imagined that the question would arise probably, and that that would be the most convenient course.

Mr. *Bagwell.*] Should we pass the preamble, we must go to the clauses.

Mr. *Jackson.*] You know very well, Mr. Rodwell, from your great experience before Committees of this House, how much easier it is for parties to settle and make their arrangements before the preamble is passed, than after.

Mr. *Rodwell.*] Yes; but it is impossible for us to settle or agree one way or the other, at present.

Mr. *Jackson.*] If the Committee gather from the opponents of this measure, when they open their case and bring forward their evidence, what their views are, we can express an opinion as to what should be met, or altered, enlarged, or crippled; that I think you must agree with; but I do not see the necessity for passing the preamble first, before the Committee hear what the parties have to say.

Mr. *Richards.*] One observation fell from my learned friend; I understood him to say that we did not seem to raise any question as to risk. I do not think my learned friend could have heard the cross-examination of Mr. Evans, which is most expressly upon that point, and which is one of the points we take; if anybody is to take the risk, it should be the Metropolitan Board.

Mr. *Paull.*] Is it competent for the Committee to pass the preamble subject to certain clauses being introduced.

Mr. *Rodwell.*] Perfectly, because it is very often done in that way; it is almost an everyday practice to say "we will pass the preamble of the Bill upon the promoters undertaking to do so and so; we will not pass the preamble until we are satisfied"; that is a very ordinary way.

Mr. *Paull.*] That is, no doubt, the case with a private Bill pure and simple; but when this Bill, which is partly private and partly public, a hybrid Bill, goes to the Committee downstairs, then the preamble will have been passed, and the clauses which the Committee had required the promoters to introduce might be struck out by the House.

Mr. *Rodwell*] So they could on a private Bill; there is no difference there.

Mr. *Paull.*] But still there is a different mode of treating that.

Mr. *Rodwell.*] The question we know must be dealt with sooner or later, and I think that the Honourable Member suggests a course that we shall take; that is, at some period or other we shall be prepared to deal with the question when we know what the views of the other side are.

Viscount *Galway.*] The latter part of the preamble is this: "And whereas, in order to prevent inconvenience to the public by the frequent breaking up of the said streets and roadways, it is expedient to enable the Board to require companies or persons intending or required to place water, gas, and other pipes in the said streets and roadways, to lay the same in the subways upon proper terms and conditions, and it is also expedient to make other provision respecting the use of subways in the metropolis."

Mr. *Rodwell.*] That part of course bears upon the question as to who is to have the superintendence of the subways; that may be done by bye-laws; at present it would assist us very much if we knew distinctly what it was that they wished themselves, because we throw out things which they do not accept, and they will not give any definite scheme of their own; they do not approach us in any way, and it is only by the conduct of their case, and by the cross-examination that we can know what they mean.

Mr. *Richards.*] "Approach" them; I do not know what my learned friend means.

Mr. *Rodwell.*] I mean that you do not at present tell us as to anything you want.

Mr. *Richards.*] At present we are fighting upon the preamble, and we intend to continue to do so.

Mr. *Floyer.*] The opponents of the Bill are opposing the Bill altogether, they want to throw the Bill out, and if they cannot throw the Bill out, they will show us what they wish to introduce into the Bill to protect their interests; we cannot possibly know that until they have gone through their case.

Mr. *Rodwell.*] Just so.

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Mr. *Jackson.*] I merely asked Mr. Rodwell whether there was any provision in the Bill.

Mr. *Richards.*] The answer is no.

1909. Mr. *Bagwell* (to the *Witness*).] In the event of those subways being filled up with pipes, would the existence of the subways militate against laying down pipes in the ordinary way, as they are now laid?—No; not at all.

1910. Mr. *Duff.*] You spoke in one part of your evidence about the great number of pipes in the streets across the water forming the complication, in fact, that there is at present?—Just so.

1911. I suppose in one of the main thoroughfares, in Regent-street, or the Strand, there are an immense number of those pipes?—There are a considerable number; probably two or three water mains, and perhaps the same number of gas pipes.

1912. Do you suppose that that subway constructed in Southwark-street would have sufficient space to contain all the pipes which are now in one of the large thoroughfares?—I do not think that subway would accommodate all the pipes which it has been necessary to lay, for instance, in the Strand; it is not a thoroughfare of great importance; it is not so favourable a line to select for distribution, I take it, either for gas or water.

1913. *Chairman.*] Do you know whether the engineer, in the first instance, before the construction of these subways, had any communication with the gas engineers, so as to ascertain the probable dimensions that would be required under any circumstances?—I do not know; I have no knowledge of that.

1914. Mr. *Jackson.*] Supposing you were going to make a subway along the Strand, do you suppose you would confer with the gas and water engineers to see what their requirements would be, and make the subway accordingly?—Undoubtedly; there being some arbitrator employed, inasmuch as the company might say, we shall want a subway to hold so many pipes, and afterwards not fill it up with them.

1915. Do you know how much the level of Southwark-street is, taking the high water, or Trinity mark, lower than the Strand?—I should not like to say.

1916. But it is lower?—It is lower.

1917. On that account the gas and water companies, but particularly the gas, would select it as the grand course through which they would send a large supply of gas; they would rather choose a low level than a high one?—But not for the other side of the Thames.

1918. Mr. *Floyer.*] You spoke of pipe of a peculiar shape, an oval pipe for conveying gas, and you said it would be a very fit plan for that purpose; would it be equally applicable for conveying water?—I cannot conceive any reason why it should not be, with this exception, that as you vary from the circular section, you get a greater surface for friction.

1919. Would not the action of the water in a pipe of that construction be more likely to produce accidents than a circular pipe?—The form of the pipe is weaker, undoubtedly.

1920 In introducing those large pipes into the subway in Southwark-street, how was that managed?—They were carried down the side entrance.

1921. There would be no difficulty in carrying the pipes of larger dimensions through those sideways under the same circumstances?—I think not; you would require more power of course to deal with heavy pipes.

1922. They are always made in one length?—Twelve feet length for the large pipes, and nine feet long for the smaller ones.

1923. Do you think a 36-inch size would be carried down those side entrances as well as the smaller ones?—I think a 36-inch pipe could be got down those entrances into the subway, through the same entrances that we got our 18-inch pipe down.

1924. Mr. *Grove.*] I want to ask you one question about the accumulation of water in the pipes, there is generally an accumulation of water where there is a dip, is there not?—Yes.

1925. How do you get it out under the present system?—We either have a large receiver at the bottom, out of which we pump it by a small pipe, which passes at the bottom of it, or we can carry a small pipe to the bottom of the dip, and conduct it to a reservoir situated at any distance you please away.

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1926. At the present time, you are obliged to take up the street?—No; under the present system we have something like the water company's cock, we have a plug in the streets where we put down a pump and pump it out.

1927. There would be greater facility of course in the subway, to get it out?—I think a much better facility.

1928. *Chairman.*] What is the extent of your acquaintance with pure chemistry, I mean as to the combination of gases; have you studied that?—I have to some slight extent; but gasometry is almost the highest branch of chemistry, and not one which I could hope to be proficient in.

1929. I mean as to the nature of the explosive mixture of gas, the quantityof oxygen and hydrogen, which constitutes the explosive mixture:—Yes.

1930. And the amount of hydrogen in common coal gas, and the oxygen and atmospheric air; do you know the relative proportions?—Yes.

1931. What are the proportions?—Taking common coal gas as containing an average amount of hydrogen, which is the only explosive gas, it takes to make a destructive explosion something between eight parts of air to one of gas.

1932. In a rough way, about 10 per cent.?—Yes; to 12.

1933. Ten per cent. is the most destructive? Yes.

1934. After it passes that limit, it ceases to be explosive?—It would become explosive in a less degree, until you get beyond the limit; but it is not wholly unexplosive until you get to something like 15 parts of air to one of gas.

1935. Beyond that it makes a great flame of gas, which bursts and burns without any explosion?—Yes; I may say that, before you get to that, it is more like a flash in the pan, than an explosion.

1936. With regard to gas carburetted; hydrogen is, like all gas, a light fluid; does not it mix with the atmospheric air, and make it lighter, and make an effort to escape altogether; does it lie in a stratum, like carbonic acid?—The natural tendency of carburetted hydrogen would be to ascend; that is, if it is not confined in any way at the outset; it does mix with the atmosphere more or less.

1937. But could it lie in a stratum, like carbonic acid?—Undoubtedly not.

1938. Under heavy air, or anything else?—No.

1939. I suppose, in point of fact, air, saturated with moisture in a fog, is specifically lighter than air without being saturated by fog; do you know that?—I think not.

The Witness withdrew.

Mr. *Edward Easton*, called; Examined by Mr. *Rodwell.*

Mr. *E. Easton.*

1940. You are a partner in the firm of Easton and Amos, who are well known engineers, and more especially, I believe, connected with water supply?—I am.

1941. You have had very considerable experience, for many years, in laying down water pipes?—I have, for the last 17 years, had very large experience.

1942. Have you examined the Southwark-street subway?—I have.

1943. And the Covent Garden subway, also?—That also.

1944. Is there any difficulty whatever in laying down pipes in those subways?—None whatever.

1945. You, I believe, laid down pipes at Rouen, did you not, in the subway which there is there?—Yes.

1946. Those are water pipes?—Water pipes.

1947. For what length were they laid down?—They were laid down in the subway nearly a mile long, 1,600 metres.

1948. Will you be good enough to say what the height of the subway there was, and what the size of the pipes there is?—The height varied very considerably, but the average section was about 5 feet 3 inches high, and 3 feet 2 inches wide.

1949. What was the size of the pipes you laid down there?—They were 40 centimetres internal diameter, or 16 inches.

1950. Had you any difficulty in laying those down?—There was a difficulty, because of the smallness of the subway; but they were done, and done at a price by the contractor.

1951. And done well?—And done perfectly well.

1952. Having had the experience in this particular instance, can you suggest any difficulty that there would be in laying pipes down for gas or water in the subways of the metropolis?—There is no difficulty.

1953. Viscount *Galway.*] What were the pipes?—Cast-iron pipes for water.

1954. *Chairman.*] On the English system, or French?—They were on the English system; I insisted on having them on the English system. The French engineers wanted a difference, but we disagreed about that, and it was done on the English system.

1955. Mr. *Rodwell.*] Taking the size of these pipes, and the space which you had to work in, I understand you to say that there was much more difficulty in performing the operations in the Rouen subway than there would be here?—Clearly, it being only 3 feet 2 inches wide, and not being the height of a man, they could not do it so well.

1956. Can you state at all what the relative prices would be of laying similar pipes down in the subway to laying them down in the earth?—I am prepared to state for what sum we would undertake to lay these six pipes in that subway, or any one of them, the man is in the room; I have had some pipes laid in the Southwark-street subway, and I have had them laid the same as are shown on one side; we have already laid a 6-inch one right over one of the gas pipes to the other side; and although the quantity was short, I am quite prepared now to say that I will do it for so much money, and I base my calculation upon this short piece; of course, if I had a great deal longer to lay, I should be able to make much better arrangements, in the way of having a truck to go along the bottom of the tunnel; a better organisation of men; those pipes had to be carried out from the outside, and carried by hand into the place and put into their places and jointed, so that I am quite satisfied that I shall not be doing any injury to my firm in the estimate which I am now going to give you, of what we will do them for absolutely.

1957. Viscount *Galway.*] For gas and water pipes, or both?—Both; we have done as much in the way of gas as we have in water; but we have supplied several towns with gas pipes also; the same men who did this, have laid hundreds of miles, I have no doubt, of gas mains as well, and so have most of our other men been accustomed to this sort of thing, and I should not have the slightest hesitation in making such a contract; if I had to lay one 18-inch main, say for a water company, I should be very happy to do it for 5 *s.* a yard run, including everything.

1958. What would the corresponding price be to lay it in the road?—In this street; it is not quite fair to take Southwark-street as it is, because the concrete is put down upon the top of the arch, and then the paving is put upon that; I believe the concrete in most cases is not quite so substantially done in most of the streets in London, but in the ordinary streets I believe the price charged by contract is 9 *s.* per yard.

1959. Mr. *Rodwell.*] You were going on with the estimate?—If it was a gas pipe it would be a little less, because there is less lead generally put into the joints of gas pipes, probably 4 *s.* 6 *d.* would pay me very well indeed; if I had to lay a 9-inch pipe alone, I should be very happy to do it at 2 *s.* 3 *d.* per lineal yard, and a 6-inch for 1 *s.* 7 *d.*

1960. Pledging yourself, as it were, that you would take those prices, you have, I suppose, considered all questions as to the reluctance of the men, or their fear of going into those subways to work, and all the other matters which have been urged against this on the ground of danger?—I have taken everything into account.

1961. Do you attach importance to those suggestions?—I do not; the man, who has been in our employment for a considerable time, and who was employed in laying these pipes, is here, and will speak for himself whether he had any reluctance; I think, on the contrary, in hot weather, such as we have had lately, that he would prefer laying the pipes in a subway like that to laying them in the road.

1962. With regard to the light there; do you believe that you could fix those pipes and do the necessary work there without candle light at all?—I do indeed; I made

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I made some experiments; I would undertake to lay in those six pipes, and go at it day and night, and never have a candle in the subway at all.

1963. Viscount *Galway.*] Using reflectors?—Using reflectors.

1964. *Chairman.*] How would you manage at night?—Day and night by using reflectors; in that case I would have probably an electric light, or any sort of artificial light, put at a distance from the top of the hole going into the subway, and reflected down by a reflector. We have made experiments upon that, and if it were insisted upon that there should be no candle taken into the subway, I could do that.

1965. Mr. *Rodwell.*] It has been suggested that there might be a bursting of water pipes so suddenly as to inundate the subway, and that the workmen would be liable to be washed away; what do you say to that?—A little calculation would show the entire fallacy of that.

1966. Will you give the calculation?—To fill a subway for that length three feet deep at the rate of 10,000 gallons a minute would take about 72 minutes; and 10,000 gallons a minute is more than could possibly come through an 18-inch main; and my reason for saying that is this, that I believe I am stating a fact when I say that the total quantity of water pumped by the Southwark and Vauxhall Company is very little more than 10,000 gallons a minute, and it would be impossible to concentrate that into that one street; therefore, in taking 10,000 gallons a minute, I am taking a great deal more than could possibly come out; and independent of that, the flow of water through pipes is, as you are very well aware, I have no doubt, according to the height of the head above, and to the length of the pipe. I think it would be fair to take the pipe at all events at two miles long, not less than that, taking it right away from the engine, or wherever it comes from. It would require 600 feet head, or about four times as much pressure or between three and four times as much pressure as that which exists at the water works, to drive out that 10,000 gallons a minute. I think I am therefore justified in saying that that quantity never would under any circumstances whatever come out of an 18-inch pipe.

1967. Viscount *Galway.*] What is the thickness of the pipe?—An 18-inch pipe probably about three-quarters of an inch.

1968. Mr. *Rodwell.*] In giving this estimate that it would require so much water, and take 72 minutes to fill the subway to the extent of three feet, have you made any allowance for the escape of water down the sewer?—Certainly not; I have supposed that the 10,000 gallons were running with a full pressure for 72 minutes; but of course a variety of other circumstances would come into play, the pressure would fall off, for instance.

1969. The water would get down the sewer?—Yes.

1970. Viscount *Galway.*] Have you made any allowance for friction?—I have stated the allowance I have made for friction.

1971. Mr. *Rodwell.*] I am requested to ask your opinion with regard to the size and substantiality of the brick piers upon which to rest these water and gas pipes?—I consider it perfectly sufficient to put a 9-inch brick pier in cement under the three pipes. It is our usual practice, where we have to support pipes, that we should put one somewhere behind the socket of the pipes, but the support of one pier is amply sufficient; in many instances we have to use two piers to three pipes very often; but they are perfectly safe if you can put one under every pipe, that is sufficient.

Cross-examined by Mr. *Burke.*

1972. Is that the system you pursued at Rouen?—At Rouen the pipes are laid upon the surface of the ground without any support whatever.

1973. Are there any gas pipes at Rouen?—Not in the subway.

1974. Is the system of subways carried out at Rouen throughout the town, or partially?—At present they are entirely in their infancy at Rouen; very little has been done in that way at all; at Rouen the water pipes have not yet gone over the town.

1975. Since when did they commence the system of subways at Rouen?—The subway has been built I think, 300 years, it was built by the Archbishop of Rouen, somewhere about the year 1500 and something, and there was a pipe lying in it from that time.

1976. Not such a thing as a gas pipe?—No.

1977. You never saw such a thing as that at Rouen?—No.

1978. You never heard of a French engineer suggesting such a thing as laying a gas pipe in a subway?—I am not aware that I ever have.

1979. Rouen, I suppose, is lighted with gas?—Yes.

1980. And they lay their gas pipes in the roadway, the same as we do ourselves?—They do.

1981. What were the accesses to the subway at Rouen?—There was an access for the pipes about once in every 280 metres.

1982. Sufficient for the pipe?—No; they were obliged to carry it along; I forgot to mention that we were obliged to carry those pipes about 300 yards before we could place them in their position; from the openings at which the pipes were admitted into the sewer, we had to carry them 300 yards.

1983. I want to know the nature of the orifices which are allowed for the admission of the pipes, where were they?—In that case they were made sometimes in the crown of the arch exactly as that is.

1984. I mean were there any side passages?—There were side openings, what the French call "regards," made for the purpose.

1985. Are they in the pavement, or what?—Sometimes in the pavement, and, in one or two instances, absolutely under a house, it is a very old aqueduct.

1986. Were the pipes admitted vertically, or how?—When they were let down from above, they were put down generally on a slight angle.

1987. The same as a beer barrel goes into a beer cellar?—Very much like that; and in other instances, where they came in at the sides, they were carried in horizontally.

1988. That was a 16-inch pipe, was it; that was the only pipe that you had to lay down in the sewer in Rouen?—It was.

1989. So, in like manner, in London, there has only been experience of one set of pipes laid down in a sewer?—No; there have been three.

1990. I say one set of pipes for the supply of gas; there has been no such thing as gas and water, has there, laid together in a subway in London?—There is in Covent Garden.

1991. What is the size of the gas-pipe in Covent Garden?—There are two 5-inch ones.

1992. That is a very small description of pipe as compared with what you would require for supply in London, is it not?—It is not a small description of pipe for the supply of a street certainly; it is a proper one, no doubt, or else it would not be put there.

1993. To supply that particular street it may be quite sufficient, but for the supply of London you must have a very large system of pipes, must you not?—A much larger pipe, no doubt.

1994. Have you had any experience whatever in laying those large pipes of that greater capacity, such as would be required to supply water and gas throughout a very large district in a subway?—I have not; that has never been done, that I know of, yet.

1995. Your estimate includes, I think you say, all charges?—All charges from taking the pipes from the waggons to leaving them entirely perfect when laid down.

1996. When you say "from the waggons," you mean the waggons having brought them to the spot?—Certainly.

1997. You do not include bringing them to the spot?—No; I purposely eliminated that, because it is equal in both cases.

1998. In giving your estimate, you say that the average price in the earth is 9 *s.* a yard; have you had any experience in that; is it not much less than that?—It depends upon the paving. I am taking the case of a street properly paved in that way; that is about the contract price that would be given. I have no doubt it is what we should do it for.

1999. That includes carting to the place and everything else?—I dare say it may; I can show you what that would be; I had forgotten that that is a very small item.

2000. There is no rent there to be paid for the occupation of the streets?—Quite so.

2001. So that the maximum expense which the company would incur in that case, including carting to the spot, would be, according to your evidence, 9 *s.* per

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per yard?—But there is the expense of opening the streets, and repaving the streets, and so forth, wherever they have occasion to do so, to be put on to that; that is an expense that may happen next year, or five years hence, or so on. You asked me whether there was any other expense; that, I believe, is the only other expense.

2002. You are probably aware the suggestion which has been made here is to add to the cost of laying a rent for the use of the place in which the pipes are to be laid?—I am not aware of that.

2003. Perhaps you think that is rather hard upon the companies that, whereas, now the charge is 9 *s.*, which is all they pay, that they should pay what you say is 5 *s.*, plus the rent for the right of laying the pipes?—If you will excuse my not seeing, I do not see what the rent has to do with the cost of laying the pipes. If you will kindly separate those two. I put it that 4 *s.* a yard would be saved for one pipe.

2004. You put it at 5 *s.* for the 18-inch main?—It is a saving of 4 *s.* in the one; that is my view of it.

2005. You are not quite accurate, because you have excluded cartage?—I should be very happy to calculate that, it is a very small matter, half-a-crown a ton would be plenty.

2006. That depends upon where they are brought from?—In this case they might either be brought from the railway station, or from the river side, most likely from the river side, and then half-a-crown would be ample.

2007. Those are all 18-inch pipes?—They are 18-inch pipes that I am speaking of; they would cost about 20 *d.*, perhaps; that would make a difference of 7 *d.* per yard, reducing it to 8 *s.* 5 *d.*

2008. I suppose in this expense of laying, you estimate that a perfectly easy access would be afforded in all cases for the admission of the pipes?—In this estimate I would take them down the opening that is already afforded.

2009. You mean already existing as they are?—In Southwark-street.

2010. Where is the opening there?—There is one opening about 200 yards from the Blackfriars-road end, and there are other openings.

2011. What is the maximum distance in Southwark-street you would have to carry your pipes in the subway?—At present, I should think it would be about perhaps 200 yards.

2012. That is the maximum distance in your calculation; do you assume that there would be tramways afforded in the subways for the conveyance of your pipes; how would you move them in the subway?—I should take my own means; I include every thing of that kind.

2013. Put a tramway?—In laying the pipes in Southwark-street subway, I should do one of two things; I should use a four-wheeled truck, and put the pipe upon it, and drag it along in the way in which you draw it anywhere; or else what I should most probably do is, that I should use a portable railway. That has beeen used largely at the drainage works; you can lay it down, and take it up again, and it is a very cheap thing.

2014. That would depend upon the facility which the subway would afford for the using of such machinery?—I am taking now the case of the Southwark-street subway, which does afford that.

2015. The Southwark-street subway has not got a system of water and gas pipes, and service pipes, for supplying the houses, has it?—Yes; they are put in; the six pipes are now in. I think I stated before that we laid three pipes on one side of the way.

2016. I thought you told me that the water pipes were not in the subway?—The pipes are there certainly; we have put those six pipes in that you see shown on this plan. Those were the pipes that were stated by Mr. Simpson and Mr. Innes in 1864 as being the pipes that were necessary to be laid in the Southwark-street subway, and those pipes have been put in, and they were put in under the most unfavourable circumstances; and when I jointed them, I put a 6-inch pipe after the 18-inch pipe was put in.

2017. I thought no water pipe was in the Southwark-street subway at all?—The water pipes are there.

2018. To whom do they belong?—The Metropolitan Board of Works.

2019. Were they laid experimentally?—Yes; certainly.

2020. You think that it would be desirable to exclude the use of candles, and

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to adopt the electric light?—If it had not been for the extraordinary opposition of the companies to laying the pipes in the subways, I should not have thought a word about it, and I should have laid them in the way that those pipes, which you see before you, were laid: there was a 10-inch and an 18-inch main, full of gas, and we lifted these 18-inch mains over the 10-inch, which was full of gas: I see no difficulty about it.

2021. Do you, or do you not, consider that it would be desirable to adopt the electric light, which you talk of?—If I had to do it in the night, I should probably; but in the daytime I should certainly not use candles; I should use the light of the sun with a reflector.

2022. Why should you use the electric light at night, instead of candles?—It would be cheaper.

2023. Then it is on the ground of cheapness only?—It would do entirely away with the objections, of which so much has been said, by the company's engineers, as to the danger of laying the mains in the subways.

2024. You mean the danger of admitting fire?—They state that the subways would be blown up.

2025. How would you make your joints if you do not have fire?—In the way we do it ordinarily; I should let my lead down the ventilating openings from the outside.

2026. You would carry on your heating operations in the street, and then lower the lead down?—Yes; decidedly; that is how it would be done practically; I do not care how it might be ordered to be done; if we gave orders to the contrary, our men would do it that way.

2027. *Chairman.*] Could you carry the lead ready heated?—You can carry it a distance of 50 or 60 yards without its getting cold.

2028. Mr. *Burke.*] Would red hot or boiling lead brought in contact with explosive matter ignite gunpowder, or not?—I do not think boiling lead would, but red hot lead would.

2029. Do not you think that if you flung a handful of gunpowder into a cauldron of boiling lead, it would explode?—I think most likely.

2030. Do not you think that an explosive mixture of gas would explode in the same manner, if it was brought in contact with the same substance?—If you have the gas mixed in explosive proportions, no doubt that would be so, but, generally speaking, they do not use red hot lead.

Re-examined by Mr. *Rodwell.*

2031. Molten is the word, is it not?—Yes.

2032. Now with regard to heating the lead outside and avoiding the use of candles, I understand you to say that you yourself would not care to have candles inside the subways?—We made those joints with the fires inside the subway, but the smoke caused a certain inconvenience, and I say that our foremen would not do it in that way, they would do it outside and lower it down.

2033. They would not do that on the score of danger, as suggested by the opponents of this measure?—I am sorry to say they would not think enough of the danger; they would do it for convenience, not because of danger.

2034. And so with the artificial light, you would adopt that partly from motives of economy and partly for convenience?—The experiments I have made show that the light of the sun is sufficient, with a common reflector; and I shall be able to show the Committee to-morrow the experiments I made. Of course if I can do it with a piece of our plant, as I may call it, it would save all the candles, which would otherwise be necessary, and would form a large item, for it is rather a difficult thing to keep an account of the candles that I used in dark places.

2035. You have made this statement from an actual practical experience in dealing with these pipes and laying them?—I should be prepared to take any number of miles if the company would give me the opportunity, and to engage to lay it at the prices mentioned. From competition the company would be able to get it done much cheaper.

2036. With regard to the payment of the rent, do you think it would be entirely met by the saving they would experience in not having to take up their pipes in the street?—Certainly.

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2037. Viscount *Galway.*] This Bill applies only to localities; can you at all form any judgment as to what would be the largest sized pipe that would be required; that is, either for water or gas in the most densely populated district?——

2038. *Chairman.*] What would be the largest pipe for a subway, either for gas or water?—At present the largest pipe that has been made is about 48 inches in internal diameter. No doubt that in some places such a pipe as even that would be required. For instance, for the purpose of a main leading from the works to the centre of the district. In addition to that there might be, although it would not be very likely, a 48-inch gas main; it is not very likely that the two would be required together, because the companies are not likely to be so close together as that. In such a case one large leading main only would be required; but if you take a densely populated neighbourhood, a leading thoroughfare, for instance, Tottenham Court Road, they might in all probability have in such places as that a 36-inch main; then I cannot see why they should have more than an 18-inch, and perhaps a 6-inch pipe besides; because the 18-inch pipe would be for the purpose of a district main, and the 6-inch pipe would be for the purpose of a service main.

2039. *Chairman.*] That would be the local main?—Yes; for the supply of the houses; I believe that in the case of gas there is not so much objection to tapping a main, but we water engineers do object to tap the large mains, and we put down service pipes because of the waste of water from tapping from the different houses.

2040. *Chairman.*] You will not put services in the mains if you can help it?—No; but we often have to do it, and therefore we do it.

2041. *Chairman.*] Your premises are in Southwark-street?—They are.

2042. Did you see the operation of laying down the water mains in that street during the middle of last year?—I did.

2043. Those were water mains, I think?—I believe one was a water main, and I think there were two gas mains.

2044. Do you recollect the diameter of those pipes?—No; I did not notice them particularly.

2045. What was the operation gone through; first the pavement was broken up, I suppose?—They first took up the pitching; Mowlem and Birt were the contractors; then they had to break through some splendid Portland cement concrete.

2046. How thick was that?—Two feet six inches thick; I believe, I did not measure it.

2047. Was it carted away in great masses?—It had to be taken away and fresh concrete to be substituted.

2048. And then the pipes were put down?—Yes; and then they were covered up.

2049. Was it rammed?—Yes; they had to put new concrete, as I need not tell you, Sir, as the old concrete would not suit again.

2050. Then they rammed it again?—Yes.

2051. Would that be as permanent and as good a street as it was before?—Certainly not. As a matter of fact, it never has been so good as it was.

2052. Can you conceive any reason yourself, as a water engineer, why that water pipe should not have been laid on the subways at once?—None whatever.

2053. You think there would be no inconvenience in the gas pipe going in?—I think not; but the water piping ought certainly to have been laid there.

2054. Practically would there have been any difficulty in supplying your own warehouses from the water mains so laid?—Not the slightest; I could have put it in myself.

2055. Looking to what you saw, which must have been under your own observation every morning, do you not think that the expense of all that operation, apart from the inconvenience to the public from the stopping up of the street, must have been more costly than would have been the operation of putting the pipe into the subway?—In that case it was very much more so. I cannot tell you how much, but if you ask one of the gentlemen who will be coming here by and by, and who can give you precise evidence upon the point, you will be able to get the information from him as to what it did cost the company;

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company; I think you will find it was somewhat double what I have talked of here, because it was a very expensive operation I am certain.

2056. The trenches were on the other side of the street?—There were three; two on one side and one on the other.

2057. That came under your own observation?—Yes; we could not get up to the front door for several days, and therefore it necessarily came under our own observation.

2058. The public inconvenience, therefore, was considerable?—So considerable that it was a monstrous thing that that water pipe was not laid in the subway.

2059. What company was it?—I think it was the Southwark and Vauxhall Company.

2060. Mr. *Paull.*] The calculations you have given us relate to new streets?—What calculation.

2061. Merely the calculations with regard to the cost of laying the pipes; they are laid upon a new street, Southwark being a new subway?—Yes; or you may take a new subway.

2062. But I am talking of a new street in which pipes were not existing?—I was speaking of the price I gave; it was for one 18-inch pipe. I do not care whether all those five are in there or not.

2063. I will take it in the same way, it will do as well for me; my question goes to whether your calculation related to the cost of laying an 18-inch pipe in a new street?—Yes; in Southwark-street.

2064. Would that be the same if it were done in the Strand, or any old street?—If it were done in any subway, clearly it would, because the subway must be made first. There is the subway; they say, come and lay your pipes in the subway. I say I will do it for that money.

2065. *Chairman.*] That is 5 *s.*, 2 *s.* 3 *d.*, and 1 *s.* 7 *d.*?—Yes.

2066. Mr. *Paull.*] Supposing a subway constructed on an old street, have you made any calculation as to the cost of removing the old pipes?—I have made no calculation, because it would be almost impossible for me to do so without being made acquainted first with the facts of the case. It would vary according to the circumstances. Most likely taking such a street as the Strand, before they made a subway there, something else would have happened which would have pulled down both sides of the Strand, and therefore it would have been a new street; then the gas and water pipes could be taken away. It might cost the company a little expense and trouble if they go round, but it depends on the locality in which all this has to be done.

2067. Would you recommend the construction of subways in old streets?—Certainly I would; most decidedly.

2068. Take the Strand, for instance?—Most decidedly.

2069. I dare say it is all very easy, but what would be done with the existing pipes, and how would the service of gas and water be continued during the period of construction?—If the houses were left exactly as they are, and the subway was constructed all under the street, I suppose that what would have to be done would be to lay a temporary pipe for each purpose all down the street, or in sections, depending upon how much of the subway they did at one time. I can conceive their laying a pipe on each side, and doing 100 feet of subway at a time; but the mains running through the Strand, that is the big leading mains, would have of course to be provided for in another way, either by turning temporarily the water and gas through another district, or putting a temporary pipe for it.

2070. *Chairman.*] Could you not sling them up?—If they came in the place where the subway was, you must remove them, but if they came in the sideway you would sling them up.

2071. But supposing they ran down the middle of the street, they must be removed?—It depends on the depth that the subway would be under the street. If it were found that the crown of the arch of the subway was 4 feet 6 inches below the top of the street, it could all be done without any trouble at all, just in the same manner as you take the sewer down. We are engineers to the Brighton Waterworks Company, and we have taken a sewer for them under a nest of four or five pipes of leading mains. They were suspended and kept up. There was no damage fortunately, but I was in constant dread that there would be considerable damage; none however resulted, and the sewer was carried under.

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2072. Viscount *Galway.*] In the Underground Railway they had to provide in some way for the pipes through which they passed?—There they had a great deal of trouble, but they did it.

2073. They must have met with such obstructions as those you mention?—At King's Cross it was simply marvellous to see the enormous pipes coming from the Imperial Gas Company, and the manner in which it was managed.

2074. How did they get over it?—They suspended them while they were doing it.

2075. While they were building the subway underneath?—Yes; and in some cases they had to remove them. We had to remove a large pipe for Lucas, the contractor for the Metropolitan Extension, and we had to take it up and carry it across the top of the arch and down again.

2076. *Chairman.*] With regard to the form of the pipe, although no engineer, I apprehend, would adopt any other form than the form before us, still under circumstances where it was rendered necessary you would not hesitate to make it oval, whether it were a sewer or a water pipe?—Sometimes we make them oval and sometimes square; the oval is better than the square, but we do sometimes make them square. The only thing is that you have to make them a little thicker.

2077. You would not choose the square in preference to the oval, or the oval in preference to the shape before us?—No; the circular form is the proper form.

[The Witness was directed to withdraw.

Robert Pitchenau, was called in; and having been sworn, was Examined by Mr. *Wilkinson*, as follows:

R. Pitchenau.

2078. ARE you a foreman of pipe layers, in the employ of Messrs. Easton, Amos, & Co.?—Yes.

2079. Have you been 40 years in their service?—Yes.

2080. Have you had other experience than that with the Cambridge Gas Company for 12 years?—Yes.

2081. Were you engaged in laying these pipes in the Southwark subway?—Yes; I will guarantee to do it.

2082. Did you actually do what was done there with your own hand?—Yes.

2083. You did that by an ordinary candle light, and had fire for smelting the lead?—Yes.

2084. Did you find any danger or inconvenience during the operation?—Not at all.

2085. You inserted the service pipes into the mains?—I could do it.

2086. Did you not do so?—No.

2087. So far as you were employed, had you any difficulty in finding room for working on the different pipes when in that subway?—I had plenty of room.

2088. Did you find that the white paper reflectors gave you sufficient light to perform ordinary operations?—I will guarantee it.

Cross-examined by Mr. *Richards.*

2089. There were no pipes there when you went there at first?—Yes; there was an 18-inch pipe and a 9-inch pipe.

2090. You put in a 6-inch pipe?—Two 6-inches, one 9-inch, and one 18-inch pipe.

2091. I suppose now, if the 18-inch pipe had been a 36-inch pipe, you would have found it a different job altogether?—I could have managed it very well by raising the pipe a little higher.

2092. The 6-inch pipe?—No; the 18-inch pipe.

2093. Supposing the 18-inch pipe was a 36-inch pipe, that is exactly double the diameter, how would it be then?—I would guarantee to put it in.

2094. You are fond of guaranteeing?—I would guarantee to do it.

2095. Viscount *Galway.*] You are not afraid of working in a subway?—Not a bit.

2096. If they were to make a hundred subways you would work in them?—Of course I would.

[The Witness was directed to withdraw.

Mr. *Alfred Upward*, was called in; and having been sworn, was Examined by Mr. *Wilkinson*, as follows:

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2097. Are you an Engineer of the Goswell-street, Curtain-road, Station of the Chartered Gas Company?—I am.

2098. You appear here by virtue of a Speaker's Warrant?—Yes.

2099. That is, you attend under compulsion?—Yes.

2100. You are also a mechanical engineer?—I am.

2101. Have you first any experience in the erection of subways?—I erected one at the Goswell-street Station in 1851.

2102. In that subway are there a great number of mains and service pipes laid down?—There are.

2103. Have you known any instance of the escape of gas in that subway?—No.

2104. Then, as far as your experience goes, what evidence do you give to the Committee?—I think that the subways are safer than the present mode of laying mains in streets.

2105. Now I wish to direct your attention to the improvement which you have made in connecting services with mains?—I have the apparatus here (*producing the same*).

2106. *Chairman*] Is this instead of the old mode of tapping?—Yes; I can lay a service without any escape at all.

2107. That is capable of application to mains in subways?—Yes; for both gas and water.

2108. Or anywhere else?—Yes; I will describe the instrument to you. There is a small valve here, capable of being opened. If we were going to drill a main, we should fix this on the main tightly, by means of a chain clip, and then insert this plunger, which has a drilled tooth underneath. That is the drill, the cutter, and the tap to cut the screw for the service.

2109. Viscount *Galway*.] The tap follows the screw?—Yes; in tapping a main, I should first insert it in this way (*describing it*), that fits in very tightly by a leather band; it is perfectly tight, and the ordinary mode of feeding down would be adopted. I have, in this case, a telescopic screw, to show you that the distance is now brought to a very small minimum. That is placed against a wall, or a water pipe, or any other impediment that I may meet with, to feed down this drill upon the cast-iron main; and you can now imagine, I dare say, that that hole, by turning this round, has been made eventually in the pipe.

2110. *Chairman*.] It has been cut through?—Yes.

2111. The pipe being charged with gas?—Yes.

2112. The valve cutting that pipe, if necessary?—Yes.

2113. When the operation of cutting is finished it brings this tap up into the cylinder again?—Yes.

2114. Viscount *Galway*.] How do you know that it is through?—The guage will tell you that. When it is down a certain depth, you know that the main is tapped. This is then brought up to that level, and the valve shut; so that I now have the hole drilled in the main, and the valve shut again without any escape of gas. The next operation is that of putting in the service. This is called a connector. It is a piece of pipe, with a thin wafer of wax in it. Then in this position, while closed, we place this india-rubber cap over it. The valve is then opened again, and the service screwed into it in this form; then the connection is really made between the pipe and the service, and eventually a little heat (when the whole service is laid in the tap, and the tap put into the house) is brought to bear on this little thin wax wafer, and the communication is made.

2115. Viscount *Galway*.] It is a very clever invention. Have you patented it?—I have; or at least I seal on the 19th of July in this year.

2116. *Chairman*.] I think this is the operation which Mr. Denison yesterday desired should be done under the inspection of some of your engineers. Would you be ready to do that any day that may be named by the opposing Counsel; and if you like you can appoint an engineer?—Yes.

2117. Mr. *Paull*.] Have you already used that?—Not in this state.

2118. Mr. *Jackson*.] You could experiment at once?—Yes; I could do so.

2119. Mr. *Wilkinson*.] You have tried that already under a pressure of six inches, with a light burning over it, have you not?—I have tried it under a pressure of 17 inches, but I would undertake to do it with steam if requisite.

2120. Mr. *Jackson.*] What is the ordinary pressure of your gas?—In the district it would be from 10 to 12-tenths. That is not the maximum, but the average.

2121. This experiment you tried was under a pressure of 17 inches?—Yes.

2122. Mr. *Wilkinson.*] You use the pressure you have stated by order of your own Board?—Yes.

2123. You gave evidence in 1864?—Yes.

2124. Then I think it was objected to the apparatus that you then had in use that it required a good deal of space?—Yes.

2125. Have you since improved it, so that that objection does not exist?—Yes; in this way; instead of having a screw beyond the drill post, which came out 9 or 10 inches, I have adopted a telescopic screw, so that in 3 or 4 inches space you get 10 inches if you desire it; therefore you thus get all the requirements that are necessary, and utilise the impediments. It was said that I could not use it, because a main might come in my way, therefore I suggested this telescopic screw.

2126. Therefore, when you said, in answer to the Honourable Member just now, that you had not used that, you meant that you had not used that particular improvement?—Yes.

2127. You have used the apparatus upon which you gave evidence in 1864?—Yes; and it is now in use.

2128. Have you any experience to give the Committee upon the subject of transverse connection with the pipes?—I heard the objections made yesterday, but I cannot conceive that there is any serious objection in a crossing as suggested.

2129. Mr. *Jackson.*] Suppose one subway connected with another, you would have no difficulty with bend pipes in carrying the pipes over?—No.

Cross-examined by Mr. *Richards.*

2130. The paper that brought you here was the Speaker's Order?—Yes.

2130.* There was no impediment to your coming, was there?—No; I objected to come because I knew that my own Board was opposing this Bill, and I did not like to give any assistance to it.

2131. Your own Board made no objection to your coming?—I do not think they knew it.

2132. You erected a subway at your own station at Goswell-street; it was an uncommonly short one, was it not?—It is a very large room where all the works are brought, and I have placed a floor over it, and arches in some portion of it.

2133. That is to say that it is an archway under a room?—A portion of it is nothing but brick arches.

2134. What length is it?—I have no doubt that in one part it is 50 feet long, or thereabouts.

2135. That is scarcely enough to justify you in giving an opinion as to subways, is it?—I think if you were to see it you would say that it was.

2136. I doubt whether I should?—I think you would.

2137. Not unless I was on the other side?—I think you would.

2138. Indeed I should not; you are very much mistaken if you suppose I should?—I should say it contains several hundred feet of pipes altogether.

2139. Several lengths of 50 feet you mean?—A great many lengths.

2140. Is it open at both ends?—There is a staircase down to it, and a little ventilator at the back; it is our valve room.

2141. It is upon that experience that you express your opinion upon subways?—I believe that subways would be safer than the present mode.

2142. Particularly if they used your improved patent drill?—I think they could do without it if they laid the services before the mains were charged.

2143. That machine of yours has not been used at present much has it?—The Chartered Company have used it. I have not tried to push it, because hitherto it has not been perfect.

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2144. You have not advertised it?—It was not perfect, and therefore I have not hitherto pushed it.

2145. It is in a condition now to be tried, I understand?—I will try it with any pressure you like with a light over it.

2146. *Chairman.*] You do not mean to apply it only to subways, but it can be applied to the streets as well?—Yes; everywhere.

2147. Instead of the old fashioned method?—Yes; because the old fashioned method is very imperfect. You chip the hole, and it is impossible to chip a circular hole. This cuts out the burr right and left.

[The Witness was directed to withdraw.

Dr. *Edward Franklin* was called in; and, having been sworn, was Examined by Mr. *Rodwell.*

Dr. *E. Franklin.*

2148. You are a Professor of Chemistry at the Royal Institution, and also at the Government School of Mines?—I am.

2149. Of late years you have paid considerable attention to the manufacture of gas and to its explosive powers?—Yes; I have had considerable experience in both.

2150. You have conducted a series of experiments for years past with reference to gas and its effects?—Yes.

2151. On Monday the 3rd of June did you go down the Southwark subway?—I did.

2152. I don't think you need describe to the Committee what you found the precise size of the pipes to be, but did you find the pipes as represented in that cartoon?—Yes; much in that position.

2153. Who went with you?—Professor Way and Mr. Jones was with me.

2154. What did you do there; I believe your first object was to ascertain by a series of experiments whether there was any leakage whatever, either through the pipes themselves or through the joints of the pipes?—It was.

2155. Will you state, in your own way, what experiments you conducted to satisfy yourself upon those points?—Having filled the series of mains which have been described to the Committee perfectly with gas from the Phœnix supply, we increased the pressure on those mains to 12 inches.

2156. That is very considerably beyond the ordinary pressure employed in supplying gas?—Very considerably beyond it.

2157. To what extent?—I think two inches may be regarded as something like a maximum. Under this pressure of 12 inches I found that the leakage amounted to 2·3 cubic feet per hour from the two series of mains. The pressure was then reduced to six inches of water, and the escape then fell to 0·72 cubic feet. At this stage of the experiments I inserted into the main a very small jet, a single jet burner, precisely such as is used for sealing letters or lighting cigars, and I observed the increased escape of gas due to this course over and above what was escaping from the mains. The leakage then rose from 0·72 feet to 2·4 cubic feet per hour. The next experiment was with a pressure of three inches of water on the mains, and the escape then proved to be 0·36 cubic feet per hour.

2158. Have you finished that portion of your statement?—Yes.

2159. Were any of those escapes practicably appreciable?—Certainly not; there was not the slightest odour of gas in the subway, and they could not be appreciated by the approach of a flame to any part of the pipes.

2160. Where do you suppose this escape, which was the utmost you have detected, proceeded from?—From the joints I have no doubt.

2161. I believe you can give an opinion as to the effect of gas escaping from the pipe itself in any way?—I don't think any gas escapes through the pores of the pipe itself.

2162. But, whatever the escape, it comes from the joints?—I believe so.

2163. Would the result of the experiments justify a practical man like Mr. Jones, in saying yesterday that there was no escape at all practically, if the joints were well made?—I think so for this reason, I have no hesitation in saying, that if that escape were increased a hundred fold, it would not be worth notice.

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2164. Viscount *Galway.*] You mean with ventilation?—With the ventilation at present existing in that subway.

2165. Mr. *Rodwell.*] If there were a hundred times this escape of gas, there would be no danger supposing there were the ventilation which now exists in the subway?—Certainly not; there would be no danger whatever.

2166. Now as the result of your opinion which you do not give carelessly, I presume you think that gas pipes might be introduced into the subways without any risk or danger?—I do.

2167. Do you also think, comparing the explosions which take place in the sewers, from the imperfect mode in which the gas pipes are now laid, that the amount of danger would be diminished by subways?—I certainly do with regard to the spontaneous escape of gas.

2168. You have observed in the course of your inquiries, the state of the soil in the metropolis where gas has escaped?—I have.

2169. Do you agree with Mr. Bramwell and the other witnesses we have called, that the earth to a certain extent absorbs the gas?—Yes; no doubt it absorbs the hydro-carbons in the gas, and therefore becomes very offensive.

2170. After the soil is thoroughly saturated, the gas effects its escape in whatever direction it can?—Yes; and you must not suppose that this material which is absorbed by the soil, is the most explosive part of the gas; it is on the contrary the least explosive part.

2171. And the most offensive?—Yes.

2172. And you are prepared to give your opinion that the liability to explosion, with ordinary care and proper precaution, is at a minimum if the pipes are laid in subways?—Yes.

Cross-Examined by Mr. *Richards.*

2173. You spoke of the state of the soil, Dr. Franklin; I apprehend that is frequently due, not to any great escape in quantity at a time, but to a prolonged escape?—I think mainly; a moderate escape.

2174. Moderate in quantity, but continued for a long time undetected?—Yes.

2175. Mr. Hawkesley said the same thing on the other inquiry; am I right in saying that the mixture of gas and atmospheric air become explosive when the gas is about one to eleven?—You mean one part of gas to eleven of atmospheric air; one part of gas to ten of atmospheric air constitutes the most explosive compound.

2176. And it ceases to be explosive, and becomes immediately combustible when it is about one to four?—Yes; one to four or four and a half; it depends on the quality of the gas; one to seven, from that to one to ten is extremely explosive.

2177. I ought not to waste time by asking you questions simply for my own information; but may I ask you what is the explosive character of that compound, as compared with the explosive power of gunpowder?—It is very slight; I think the expansion of gunpowder in explosion is something like 480 times the volume of the powder; this would be a maximum of not more than five times its volume.

2178. Would it be enough to blow a workman across the street?—Yes.

2179. *Chairman.*] The comparison is, as one to five is to one to 400?—Yes.

2180. That is taking it in its most explosive state?—Yes.

2181. Mr. *Richards.*] When did you make those experiments in the subway?—About a fortnight ago; they were continued about a fortnight altogether.

2182. You were engaged by the Metropolitan Board of Works to make those experiments with reference to this inquiry?—Yes; I was requested to test those mains that were laid there, and I did so; I visited the subways many successive days for that purpose.

2183. Did you put any of the leakage down to percolation through the pores of the pipes?—No; I think not; I think the leakage is entirely through the joints.

2184. I think you were examined upon a gas inquiry in another room this year?—Yes.

2185. Let me call your attention to your answer to Question 229 (*the learned counsel read the same*); that is so, is it not?—Yes.

2186. The leakage is due to the percolation of the gas through the pipes, you say?—Yes; but that scarcely expresses exactly the meaning of my answer, which was intended to convey that the leakage took place through the joints of the pipes; I was certainly then, under the impression that a certain amount of leakage would take place through the pores of the metal itself.

2187. But you have changed your opinion since the 24th of May?—At that time I was in doubt as to the leakage through the pores of the pipes, but now I do not believe that the leakage does take place through the pores.

2188. The leakage through the joints, I understand you to say, was almost inappreciable?—It was practically inappreciable.

2189. How did you get a 12-inch pressure in the subway?—We had a small gasholder after the mains were filled, then the gasholder was filled also from the main, and the supply of the gasholder was then cut off, and the gasholder was depressed.

2190. Supposing an escape to take place, as you are peculiarly able to answer questions of this sort, I will ask you whether the gas ascends to the crown of the arch?—Yes.

2191. As the quantity of gas increases, I suppose it descends, making a thicker and thicker strata above the atmospheric air?—Yes; if it cannot get out it will do so.

2192. The mode of exit is to be by a ventilating shaft?—Yes.

2193. Taking the less advantageous state of the atmosphere, do you think that the gas will always escape by these ventilating shafts?—I think so.

2194. Supposing an escape from an 18-inch main, would there not be considerable danger in entering, during the time of escape, the subway with a light?—Do you mean if the extremity of the main were left open, and the gas to be flowing out of it?

2195. No; I do not mean that; but I am supposing a reasonably sized crack in an 18-inch main?—I should not think so; I think in such a case, if a workman were to go into it with a naked candle, and lifted the candle up to the crown of the arch, he might get an explosion, but if he kept the candle near the floor I do not think it would be possible even in that extreme case.

2196. But our experience of mines shows that workmen do not take care, but that they are most reckless?—Yes; I remember that explosion in Wood-street, which was due to carelessness, no doubt, on the part of the workmen.

2197. That is the one that has been decided?—Yes; I am alluding to the Wood-street case.

2198. You have told us about the mixture being explosive, is it suffocating also; under what conditions does it become suffocating?—It is suffocating if you have a proportion of as much as say one part of gas to 14 or 16, or even 20 parts of air; it very soon affects the workmen who are in it if there be those proportions; they are not able to bear it long.

2199. That is long before it is explosive?—Yes.

2200. It becomes explosive when one part of gas is mixed with 10 or 11 parts of atmospheric air?—Or 13 or 14 of atmospheric air.

2201. But one in 20 is offensive?—Yes; and between those limits.

Re-examined by Mr. *Rodwell.*

2202. Before a man was suffocated he would smell the gas?—Yes; besides which he would not be suffocated immediately; he would have time to escape.

2203. My friend assumed a man without a nose, I suppose; is it a fact that the explosion of gas is used as a motive power?—Yes.

2204. Did you ever hear of gunpowder being used for that purpose?—I have heard it proposed, and I think even in experimental models it may have been used, but it was very soon given up.

2205. Since the 24th of May, I think there has been a great difference of opinion between you and some other scientific gentlemen with reference to the escape of gas through iron; if the pipes are properly made, your opinion is now

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that there is no such escape?—I believe, from the exceeding smallness of the escape from the immense surface of the pipes in the subway, that there can be no practical leakage from the pores of the pipes; I know some of those pipes were made in such a manner, that is with yarn and red lead, as to make them expansive, and escape must take place.

2206. If the ventilator is open, that gas must necessarily find its way to the aperture?—Certainly.

2207. That is the law?—It will rise to the crown of the arch, and will take the first opportunity of escaping.

2208. Mr. *Paull.*] My fears were somewhat disabused until I saw Dr. Franklin; I understood you to say that if a light were raised to the crown of the arch, while a current of gas was flowing along it, that there might be an explosion?—Yes; if a sufficient amount of gas were mixed with the air at the crown of the arch, an explosion would undoubtedly arise.

2209. If the ventilating shafts are 60 feet apart, is 30 feet a sufficient distance to allow of an accumulation of gas at the crown of the arch, so large, that if a light reached that current of gas in the crown of the arch, it would cause an explosion?—My answer referred to a special case. It was supposed that there was a considerable crack in one of those mains, and that the gas was rushing out of that crack. Rushing out of the crack, it would infringe on the crown of the arch, and would there form a slight stratum of gas, which would be more or less mixed with the atmospheric air immediately below it. I meant to say that if, while that state of things continued, the workman were to raise his candle to the very roof of the subway, an explosion would take place, but it would be very slight; it would be a local explosion of a few cubic feet of air and gas in the immediate vicinity of the place of escape. The parts of the subway further removed from the source of the gas could not if the present state of ventilation of the subway were maintained, unless there were a very large escape of gas indeed, form an explosive mixture. The escape from the ventilator would be sufficient to prevent that; but a rush of gas rising against the roof in a considerable volume would, I conceive, form an explosive mixture.

2210-11. It would form an explosive mixture in the crown of the arch?—Yes.

2212. And if a candle were placed near it, an explosion, whether small or great, would necessarily take place?—Yes; undoubtedly.

2213. Is it not extremely likely that workmen, like other persons who walk in dark places, would hold the candle above their heads?—They ought not to do so under such circumstances, and they do not do it in mines where explosion is possible. It is a well-known rule there to hold the candle as low as possible in walking along the galleries, because the gas accumulates in the upper parts of the ways.

2214. Rightly or wrongly, most people who walk in dark passages place the light above their heads rather than on the ground?—I observed the way in which the workmen who attended to us on the occasion of our visiting these subways used their lights, and although they carried them higher than I should like them to do when the subways are in full work, I observed that they never carried them above the middle; they carried them about this height (*explaining it*).

2215. When you say that the explosion would be local and slight, may I ask you, have you ever seen a gas gun?—On a large scale; do you mean a gun to be actually used?

2216. No; a gasometer; if they are made so that when the explosion was created it would discharge a projectile?—I have seen an experimental gun for lecture experiments, but not one actually to be employed for the firing of projectiles.

2217. I am not alluding to its being used for the purposes of war, but for the purpose of testing the explosive power of say a cubic foot of gas and air mixed in the proportions you have indicated to be the most explosive compound?—Yes; I have made experiments myself, and I have found great difficulty in dealing with only a cubic foot or two in getting anything than an ordinary spectator would call an explosion. I have endeavoured to get an explosion with that quantity for the purpose of illustrating a lecture. I have had a model house made with tissue paper windows, and I have found great difficulty with such a small quantity as that to get an explosion sufficient to blow out the tissue paper windows.

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2218. Would it surprise you to hear that if a cubic foot of the compound of atmospheric air and gas in the most explosive proportions were placed in a gun, that it would discharge a lump of iron twice the size of this (*describing it,* 50 yards ?—Oh, I think it might if it were in a barrel, so that the whole force took effect in one particular direction.

2219. But if one cubic foot confined in a barrel in that way would discharge five or six pounds of iron 50 yards, surely an explosion in a subway, even of a cubic foot would be sufficient to do considerable damage?—I think not; I think it would be totally inappreciable at a distance of two or three yards from the place where it occurred; that is, an explosion of a cubic foot of explosive mixture of the highest explosive power.

2220. Would it do any damage to the gratings?—Certainly not; it would not even damage the man who exploded it.

2221. If a cubic foot of it, when ignited, would be sufficient to discharge a lump of iron that size 20 yards, do you say that it would not be enough to injure the man who discharged it in a subway?—Yes; if you were to put a quarter of an ounce of gunpowder into the barrel you have mentioned, it would do the same thing; but if you were to ignite a quarter of an ounce of gunpowder in the air, it would have no effect.

2222. Mr. *Jackson.*] You do not think that there is any similarity in the two cases; that is, in the case of a discharge from a barrel, and a discharge in the subway?—The only similarity could be obtained in this way; if the subway were perfectly filled with the explosive mixture, then undoubtedly you would get a tremendous effect.

2223. Mr. *Floyer.*] Did you hear any account of that explosion, or accident, which took place on the Pont d'Austerlitz?—I only heard it quite recently.

2224. You can form no judgment as to where it took place; that is, whether it took place in the pipe, or in the subway?—No; I have not data sufficient to form an opinion.

2225. Viscount *Galway.*] With regard to these accidents in subways, there must be an enormous amount of gas collected if it be likely to inflict any serious injury, such as the knocking down of the houses on the side of the road?—It must be a very serious escape indeed that would do such a thing as that. It must be such an escape as would result from the breakage of the pipe, or from its being left open at the end of the main.

2226. That is a thing scarcely likely to happen with a daily inspection of the pipes?—It is an accident that could only happen by the grossest carelessness; of course it is impossible to say that it would never happen, because no one can tell to what extent carelessness may not go.

2227. Mr. *Floyer.*] As long as the ventilators were open could such a quantity of gas accumulate as would produce that effect?—It is within the bounds of possibility that if the main were broken, or if the main were left open and the gas allowed to stream for an hour such an effect might take place as would create a serious explosion between the two ventilators.

2228. You think that enough might accumulate to give rise to a serious explosion?—If the aperture where the gas escaped from were very large indeed, so that the ventilators could not carry it off rapidly, that might be so.

2229. Do you suppose those ventilators are not sufficiently large to carry off a large escape?—They are large enough to carry off any escape that I could conceive.

2230. Could they carry off any possible escape that could take place from ordinary pipes, or pipes that would be easily laid?—I think so; they would carry off any escape that could arise from any ordinary operations that would have to be performed, and such as are ordinarily performed in the street.

2231. Mr. *Duff.*] If there were a large escape of gas out of these pipes would that cause a greater upward draught?—Certainly; these ventilators would come into active operation when they were wanted.

2232. There would be a greater draught if a large escape took place?—The greater the escape, the greater would be the action of the ventilators.

2233. Mr. *Jackson.*] If they had a warmed shaft you would have no fear of an explosion?—I would not recommend a warm ventilating shaft; we want a ventilator to come into play when the gas is escaping; that you get very perfectly through the crown of the arch, because then the air would rush out at one

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one place and would come in at another, and so would draw the gas forward; but if you had a ventilating shaft, which, as I understand, would be erected in some particular locality, it would cause an inward draught, and would prevent rather than promote the escape of the gas, should any quantity of gas suddenly escape.

2234. You are aware that in coal mines there are two shafts, the one with an upward draught and the other with a downward draught, and that the upward shaft is always kept warm to accelerate the passage of the atmosphere?—Yes; but if you could have ventilators in the crowns of the galleries, that would be infinitely superior to the shafts.

2235. *Chairman.*] Do you think this state of things is true or likely to be true; it has been suggested that the openings we have referred to, would be sufficient on all ordinary occasions, but would not be sufficient when the internal air is colder than the external air, for the gas will always lie dead in the subway unless the subway is inclined, and that then the gas would run down hill like water, and would so find its way out; is that a state of things that would exist in nature?—No; I think not; on the contrary, the reverse would be the case, I cannot conceive such a state of things as that; the denser the air in the subway, the more rapidly the gas would rise to the crown of the arch.

2236. I mean, supposing there was a heavy fog, would gas escaping under such circumstances, have a tendency to rise through the fog as under all ordinary circumstances or would it be more difficult?—I think it would escape just as rapidly if the barometer were higher, and if the state of the air were denser.

2237. It would not flow down hill like carbonic acid?—Certainly not; it could not possibly do that under any circumstances.

2238. Mr. *Paull.*] you say that there might be an explosion?—Undoubtedly.

2239. If there were one it would be local, you say?—Yes.

2240. And it would not suffice, except under very serious circumstances, to blow out even the ventilators?—I think not, except under very serious circumstances; I can imagine an explosion in a subway that would blow the whole street up; I would engage to produce such an explosion if it were wanted, but it must be done on purpose.

2241. Monsieur Belgrand told the Committee in 1864 that an explosion having taken place in a sewer, in which there were ventilators, the street sweepers were knocked down, and the ventilators of the sewer were blown up as high as the first floor windows of the houses, and the windows were broken. Now, in your judgment, in these subways, is that a state of things which, even if an explosion took place, could not occur?—That is a very difficult question to answer, unless I know the kind of ventilation that there was in the sewer.

2242. *Chairman.*] Supposing there was none at all?—Then such a state of things could occur.

2243. Mr. *Paull.*] It is not only in the singular but in the plural number that this statement is made. It is said that the ventilators in this sewer were blown up. Now, if, as you say, the explosion would be local, I do not understand how even ventilators at 60 feet apart could be blown up?—Yes; the two things are not at all incompatible; if you have a local explosion of sufficient magnitude you would blow up the ventilators for a mile along the subway; if these ventilators were a quarter of a mile or half a mile apart, I can readily imagine such an explosive mixture accumulating in one part, and being there ignited, and drawing such a blast along both directions of the sewer as would blow up the ventilators in the manner described.

2244. If the explosion were local, might not the concussion break up the gas and water pipes?—If the explosion were violent enough it might; but I do not think it at all likely that it would break the gas and water pipes; I think they would be the last to go. The crown of the arch would be blown out, I think, before such as that could arise.

[The Witness was then directed to withdraw.

Dugald Campbell, Esq., was called in; and, having been sworn, was Examined, as follows, by Mr. *Rodwell.*

2245. You are an Analytical Chemist, and formerly Lecturer at University College, in Chemistry?—I was.

2246. Have you been down these subways yourself?—I have.

2247. You heard the evidence given by Dr. Franklin, and you heard him describe the experiments which he performed in the subways?—I did.

2248. Do you agree with him in the evidence he has given with regard to the amount of escape of gas, its being inocuous in quantity, and the little liability to explosion that there is in subways, in his judgment?—I do.

Cross-examined by Mr. *Rodwell.*

2249. What was the size of the ventilator?—About two feet square, I think, was the size of those I saw; I did not measure them exactly, but they appeared to be about two feet square.

2250. You saw them in the street?—I was underneath; I could have measured them, but I did not happen to have a rule with me.

2251. I do not know whether you have had much experience in this sort of question, but gas will lodge in cavities?—I have an experience of 20 years in almost every gas question of importance.

2252. I am not doubting your experience, but I ask you, is it not the fact that gas will lodge in cavities where it is not disturbed by a current of air?—Certainly.

2253. While you were in the subways, did you examine the side galleries?—I examined the whole work.

2254. You observed a great quantity of little recesses?—Yes; at every so many yards there were recesses on each side.

2255. At every two houses there is a little recess?—I do not know exactly that there is at every two houses, but at any rate there are a number of recesses.

2256. They are described there, are they not?—Yes.

2257. The cubical contents of those would be considerable?—They would.

Re-examined by Mr. *Rodwell.*

2258. My friend, no doubt, means to suggest that the gas would lodge there. Would that happen with ventilation?—It would not; it must find its way to the roof, and get out.

2259. My friend means to suggest that it would lodge in the corners?—It could not go down against the gravity of the air; it would rise to the crown of the arch.

2260. However high the arch was, it would find its way there sooner or later?—Yes.

2261. Do you think that with that ventilation that there is any probability of an explosion of the serious nature which Dr. Franklin mentioned happening?—I do not think so.

2262. Do you think with that ventilation that there could be an explosion so serious as that mentioned by the Honourable Member for St. Ives?—No.

2263. Why not?—Because there is such a space for the escape of the gas, that it could not lodge in such a quantity as to become dangerous; you might if you held a candle just over the fissure where the gas escaped at the roof of the arch, get an explosion there, but not under any other circumstance, unless you were to close up the ventilation.

2264. I am assuming that the ventilators are in full operation?—Yes.

2265. Mr. *Richards.*] Supposing there was snow?—I do not think the ventilator which I saw would be closed with snow. I think that the temperature of the subway would very soon melt the snow.

2266. Mr. *Paull.*] Why do you limit the chance of the explosion to the ventilator, *D. Campbell*, Esq.

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ventilator, might it not occur midway between the two ventilators?—I think it would be over mixed with air before it got that distance to cause an explosion.

2267. Supposing the escape to take place midway between the two ventilators, and that then the mixture were to take place at the crown of the arch, why should not the explosion take place there as soon as at the ventilator?—I am sure it would take place there.

2268. That would be completely in the tunnel, and therefore in a confined place?—Yes; but it would be a mere local explosion, and one not at all of a dangerous character. I would not mind about making the experiment myself; I would not mind about exploding the gas myself.

[The Witness was directed to withdraw.

Mr. *William Walker*, was called in; and having been sworn, was Examined by Mr. *Wilkinson*, as follows:

Mr. *W. Walker.*

2269. You are a clerk in the employment of the Metropolitan Board of Works?—I am.

2270. Were you employed by them to take the external temperature outside the subway, and the internal temperature of the subway, from the 2nd April to the 2nd of June?—Yes.

2271. Have you a table illustrating the results?—Yes.

Vide Appendix.

2272. Will you produce it?—This is it (*producing same*).

2273. In the short result of that there is a difference of 50 degrees between the maximum and the minimum temperature outside, and a difference of 17 degrees between the maximum and minimum temperature inside?—Yes; that is about the difference.

2274. Mr. *Jackson.*] Is there a difference of temperature outside of 50 degrees?—Yes.

2275. Mr. *Wilkinson.*] There is a variation outside of 50 degrees, and inside of 17 degrees during that period?—Yes.

Cross-examined by Mr. *Richards.*

2276. You began your experiments on the 2nd April?—Yes.

Mr. *Rodwell* stated that he did not wish to ask this Witness any further questions.

[The Witness was directed to withdraw.

Mr. *Edwin Patchett*, was called in; and, having been sworn, was Examined by Mr. *Rodwell*, as follows:

Mr. *E. Patchett*

2277. You are a Solicitor, at Nottingham?—Yes.

2278. You are Clerk to the Magistrates?—Yes.

2279. You have been twice Mayor of Nottingham?—Yes.

2280. You have introduced into Nottingham some subways?—Yes.

2281. State to the Committee your experience and opinion, and the general opinion with reference to the advisability of putting gas and water pipes into subways?—Extremely favourable, and we believe it to be a very great convenience to the public.

2282. When the first subway was made, I believe there was very little disinclination on the part of the gas companies to put their pipes in the subways?—I am not aware of any.

2283. In what year was that?—1862.

2284. Subsequently we know there were some subways made which were ready for the introduction of pipes in 1865?—Yes.

2285. They have declined to allow the pipes to be laid in those subways?—Yes.

2286. Do you know the reason?—It was alleged that there was supposed to be some danger to life and property.

2287. Had

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2287. Had there been any experience at all to lead to that inference with regard to the subways that had been used ?—We believed from experience quite the contrary.

2288. Have you had any good reason against introducing the subways, except the apprehension which some parties connected with the gas companies, have expressed ?— Not the slightest.

2289. Did you on the part of the corporation make some proposal to the gas companies, in consequence of their observations, to hold them harmless if they would put their pipes in the subway ?—The Improvement Committee passed a resolution so far as they could.

2290. Mr. *Denison.*] Do you produce that resolution ?—There was no resolution ; it was a mere conversation. There was a conversation in the Improvement Committee to the effect that it would be desirable, to show the confidence of the Committee in the subways, for them to give a guarantee. In consequence of a suggestion by the gas company, a deputation, of which I was one, waited upon the Gas Committee, and offered to hold them harmless, so far as we reasonably could (to show our own confidence), from any consequences.

2291. For a limited period ?—Yes ; of two years.

2292. The Town Council were unanimous upon this subject, were they not ?—The Improvement Committee were entirely unanimous. They consisted of 13 Members of the Council. There were only two or three dissentients in the Council, which consisted of 56 members, and of those three dissentients I believe a majority of them were directors of the gas company.

2293. Those then who gave their best attention to the subject, namely, the Improvement Commissioners, were to a man in favour of giving this undertaking ?—Certainly.

2294. Was a special committee of the Nottingham Gas Light and Coke Company held, at which a resolution of the Common Council was produced ?—I believe there was.

2295. Have you a copy of the resolution ?—Yes ; I have a resolution which the Gas Company sent to the Common Council.

2296. Is this the resolution ?—

"At a Special Meeting of the Committee of the Nottingham Gas Light and Coke Company, held at the Gas Office, Nottingham, the 23rd November 1865,

"The letter of the Town Clerk, of yesterday's date, was read, and a deputation from the Town Council attended the meeting in support of the application.

"*Resolved,*—That the reasons of the company for declining to lay their mains in the subway in Lister Gate, in accordance with the request of the Town Council, have on several occasions been so fully made known to the Corporation, that it is unnecessary now to repeat them, and subsequent occurrences, in various places, have only tended to confirm those objections. The committee, therefore, feel it to be their duty, both in the interests of the public, and of the company, to adhere to their previous resolution of laying the main on each side of the road, but outside the subway."

I believe that is it.

2297. You were very anxious, and pressed them as much as you could, to use these subways, but you could not induce them to do so ?—That is so.

2298. When the Improvement Commissioners offered that guarantee, it was done merely for temporary purposes, for two years, in order to show your sincerity and your confidence in the scheme ?—It was.

2299. That did not at all bind you to any future legislation upon the subject ?—Well, I need not say that in strict law the Committee were aware they could not give such a binding guarantee, but they offered it to the gas company as a proof of the sincerity of their belief that the subways were unattended with danger ; and if the Gas Company had accepted it, the Improvement Committee were prepared to ask the Council to confirm the guarantee.

2300. Of course this was done from the extreme advantages which the public of Nottingham had derived from the substitution of subways for the previous system ?—From a conviction of the great inconvenience that the public sustained, by reason of the constant breaking up of the roadways, and from a conviction of the great convenience attending the laying of the subway in Victoria-street, which was the first street in which they were laid, and from a conviction that an equally great convenience would attend the laying of subways in any new streets that were subsequently made.

Cross-examined

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Cross-examined by Mr. *Denison.*

2301. I do not think you have told us much more than the gentleman who was examined here on the first day, excepting that you said one thing that he did not, namely, that the Committee were aware that they could not give the guarantee. I may ask you, as you are a solicitor, could the council have given such a guarantee?—I apprehend not, and it was only offered in the hope of assuring the Gas Company. The Gas Company rather suggested whether it would be given or not, and it was thought by the Improvement Committee, if they declined the guarantee, that their doing so might be attributed to a want of confidence in the convenience of the system. Therefore, the Committee at once said they would give the guarantee, and if it had been accepted, they would have gone to the Council and got them to confirm it.

2302. It was like offering them a bad shilling?—Not at all; it was offered as a proof of the conviction of the Committee of the impossibility of any accident.

2303. Was it to be a personal guarantee?—It was more a matter of conversation, but it would be reduced into form.

2304. It was not intended to be a personal guarantee?—No; but I will add this, that so convinced were the Improvement Committee of the advantages of the system and the great inconvenience to the public, that I believe if it had come to that question; whether or not there should be a personal guarantee given, I know some, and I believe many of the Improvement Committee, would have given a personal guarantee rather than allow it to go off.

2305. That is rather a guess of your own?—To a certain extent.

2306. It is not exactly evidence of fact?—Yes, it is.

2307. No such offer was made?—No; not personally.

2308. You have had more experience of Nottingham, you say, since 1864; do you not think that other people have had more experience since 1864?—I cannot say what has taken place with other people.

2309. The resolution of the gas company says so?—I am not aware of that.

2310. When did you first ask the company to go into the subways?—I think on the formation of Lister Gate-street.

2311. That was the first?—No; Victoria-street was the first.

2312. Was it the second?—Yes; it was the second.

2313. The second in point of date, I mean?—Yes; the second in point of date.

2314. There were two together, and then a later one?—No; to the first the gas company did not offer any objection, and the water and gas was laid on at the expense of the companies. The second was Lister Gate-street, and to that they objected, and the pipes were not laid. Subsequently to that a third street was made, and a subway was also made in that.

2315. They went into the first without objection?—Yes.

2316. You possibly know that I have read the first day's evidence of Mr. Hawksley, in 1864, about that?—That was after the first had been done.

2317. I mean his reasons for consenting?—Yes.

2318. Those reasons are probably right?—I am not aware of them.

2319. You are not disposed in favour of them, probably?—I know Mr. Hawksley's talent so well, that I believe if he were to devote one tithe of his talent to doing away with the objections that have been raised, he could easily do it.

2320. I am talking of the facts merely; he stated, in 1864, that he advised the company to go into that sewer for the sake of peace and quietness, not expecting that they would be asked to go into any more?—I am not aware that such a thing took place.

Re-examined by Mr. *Rodwell.*

2321. I will read the precise words of Mr. Hawksley (*The learned Counsel read a portion of Mr. Hawksley's evidence, from the words,* "I was applied to," *to the words,* "in the subway"); I ask you now, was there any objection made?—Not as to Victoria-street.

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2322. The evidence goes on in this way (*the learned Counsel read a further portion of the evidence, from the words,* "I said, well, the corporation believe this," *to the words,* "on that question")?—I heard something of that as to the Lister Gate-street, that is the second subway that was made, but not anything of that kind was said as to the first.

2323. But this applies to the first, because Mr. Hawksley said he put them down for peace and quietness?—I never heard of that before.

2324. His evidence goes on in this way (*the learned Counsel read a further portion of the evidence, from the words,* "Thereupon my own assistant," *down to the words,* "than they would leave")?—I never heard of any objection as to the first.

2325. Viscount *Galway.*] At the time of this indemnity or this suggestion, who was Mayor of Nottingham?—I forget; it was Mr. Birkin or Mr. Parsons, but I cannot say which.

2326. Were they interested in the gas company?—Mr. Birkin was a director.

2327. You are not sure whether he was Mayor or not?—No.

2328. Mr. *Paull.*] This conversational guarantee was never submitted to the council at all?—No; because it was rejected by the gas company.

2329. Mr. *Jackson.*] Would you have been willing to give your personal guarantee?—I would; I felt greatly interested in the town improvements, and made myself, as far as a non-scientific man could do, familiar with the evidence on both sides, and I talked with several other committee men who were also much interested in the town improvements, and the conviction I arrived at was that the amount of danger was so small that if the giving of a personal guarantee had been suggested to me, I should not have declined to make one of the personal guarantees.

2330. Viscount *Galway.*] Have you ever heard any conversation which enables you to say why the water companies objected?—I have had conversations with most of the directors.

2331. The gas companies did state as a reason that they thought there was danger, but the water companies never gave a reason for their objection; they merely refused?—I have not had any official reason from them, but many of them are my own personal friends, and the most I could gather from gas or water companies was that their engineer, Mr. Hawksley, did not like it.

2332. Do the gas and water companies that use the Victoria-street subway pay a rent?—No; we never asked them to do so.

2333. Why not?—Because we believed the convenience to the public would be sufficiently great to justify us in forming the subways, and asking the companies to use them.

2334. Under those circumstances they had no objection to try the Victoria-street subway?—They did try it.

2335. You do not propose asking them any rental for it?—So far as the new subways are concerned, we should be glad to see the companies using them without charging them any rent.

2336. If they require to go into the two new subways, you would not charge them any rent?—That at present has been the opinion of the Improvement Committee.

2337. Then, in your judgment, the advantage to the public is so great that you think the companies ought not to be called upon to pay any rent?—I must guard my answer by limiting it to the three streets in Nottingham. I should not like to form an opinion with regard to any other place, but the three streets I have mentioned in Nottingham are such large thoroughfares, and the convenience which the public obtain is so great, by their traffic not being interrupted, that I think it would be perfectly reasonable to ask the companies to use the subways without paying any rent.

2338. Viscount *Galway.*] Are the streets on an incline or not?—Victoria-street is inclined, Market-street is considerably inclined, and Lister Gate-street is also inclined, but perhaps not so much as the others; not any of them are quite level.

2339. *Chairman.*] Are we right in the note that we have of the evidence, that in the first instance the first subway was used by the companies without any objection?—Yes.

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2340. But when the second subway was constructed, it was not used by the companies?—Yes.

2341. That notwithstanding the second was not used, you constructed the third in spite of any objection?—Yes.

2342. I want to know the reason of your doing that?—We were so satisfied that it was but a question of time when the advantage of subways would be acknowledged generally, that we determined to make the subway, being sure that it would be used sooner or later. It was only a question of time.

2343. Mr. *Jackson.*] For the use of those subways which you have made you would advise the counsel, if the companies would take their pipes there, to charge them no rent?—Certainly, Sir, and we believe that the public would be gainers by it, both pecuniarily and as far as general convenience is concerned.

[The Witness was directed to withdraw.

Mr. *Rodwell* stated that the promoters had but one more witness to call, and his evidence would close their case.

[Adjourned to To-morrow at One o'clock.

Friday, 28*th June* 1867.

MEMBERS PRESENT:

Mr. Bagwell.	Mr. Grove.
Mr. Duff.	Mr. Jackson.
Mr. Floyer.	Mr. Cornwall Legh.
Viscount Galway.	Mr. A. Paull.

VISCOUNT GALWAY IN THE CHAIR.

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Mr. *Wilkinson* stated that the promoters had intended to call Dr. Piercy yesterday, previously to announcing that they had closed their case, but it appeared that he had been unfortunately prevented from attending by an accident which had occurred upon the Metropolitan Railway, and that he was unable to attend to-day in consequence of an engagement to give a lecture, but that he would be in attendance on Tuesday, when he trusted the Committee would allow his evidence to be taken.

The *Chairman* stated that there being no objection upon the part of the promoters, the Committee would accede to the application.

Mr. *Wilkinson* stated that he should ask permission to recall Mr. Bazalgette, who was not at present in attendance, to produce some returns which had been called for by the opponents of the Bill.

Mr. *Denison* stated that he would first call his witnesses, and reserve his speech till the conclusion of his evidence.

Mr. *James Muir* called; Examined by Mr. *Denison*.

Mr. *J. Muir*.

2344. You are Engineer to the New River Company, are not you?—I am.

2345. The New River Company was spoken of in some remarks of a not very complimentary kind by the first witness who was called here, Mr. Isaacs?—Yes.

2346. One of the complaints that he made against you had reference to the pipe in Gray's Inn-road, and I think, if I remember rightly, he said that they had repaired the Grays' Inn-road in 1864, and that you tore it up again very soon afterwards?—I think his statement was, that in 1861, he had, for the Board of Works, given notice to the company of their intention to repave the street. It was not until 1864 that the New River Company did any work, and then they laid down a 16-inch new main, in lieu of two old smaller mains.

2347. The point of his complaint was that you might just as well have done it

Mr. *J. Muir.*

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it in 1861, when he gave you the notice, as waiting till 1864 ?—It was, but the answer to that is this: The short notice that we have from the parishes of their intention to repave, will not allow us to make arrangements for large works; and in the interval between 1861 and 1864, circumstances arose which made the laying of this new 16-inch main necessary.

2348. Before we go any further into that, I may ask you if the same question was gone into in the year 1864 in the Committee, and your explanation given of it ?—It was.

2349. But notwithstanding that, Mr. Isaacs renews the complaint, and therefore you must renew your answer; will you give me what circumstances there were which arose between 1861 and 1864, rendering it necessary to make those alterations ?—There has been of late years a growing demand for high service, and also the introduction of new steam fire engines, which made it appear to the directors of the New River Company an advisable thing in several districts to enlarge their mains, for the sake of a more rapid delivery of water, and in a very liberal spirit I think they responded to the request that I made to lay out something like 45,000 *l.* all over their district in London, in laying down larger mains, and that one in the Gray's Inn-road forms part of the scheme.

2350. Then all those circumstances which gave rise to that larger pipe, in fact arose after his notice, and after the repaving in 1861 ?—They did.

2351. Now he also talked about your having done something in Liquorpond-street, what answer do you give upon that?—We did nothing in Liquorpond-street after the paving of that street.

2352. Let us see what he says about that. At Question 21 he gives this answer: "In 1866 the Board say this, 'The Board would here more particularly refer to the circumstance that notwithstanding they gave the respective companies timely notice of their intention to repave the carriage way of Liquorpond-street in the spring of last year, and requested that advantage might be taken of the opportunity thus afforded of executing any repairs necessary to the pipes and mains therein, their invitation was not responded to, and they were powerless to prevent the new roadway from being taken up for the entire length of the street within a few months of its being laid down by one of the companies where mains were laid beneath the surface, comment upon such a proceeding must be unnecessary.'" As far as you know you contradict that statement ?—As far as regards Liquorpond-street, I do not know what other work may have been done; but I simply mention that the New River Company did no work in Liquorpond-street after that repaving which is referred to.

2353. Then he talked about a gas explosion in Holborn, which he attributed to one of your workmen ?—We had no workmen there at all.

2354. I heard somebody say the London Gas Company; but it was charged upon the New River Company as having done this mischief, which you answer by saying that you had no workmen there at all ?—No; no workmen there at all.

2355. Now, to go to something else, there have been some statements made about the cost of relaying pavements ?—There have.

2356. You can give the actual payments which you have made for paving in the Holborn district for four years past, I understand ?—I can. There was a statement made to the effect that the New River Company paid to the District Board of Works of Holborn, in one half year, a sum of 1,000 *l.*, and without explanation that might lead to the inference that our annual payment to the Board would be 2,000 *l.* In 1863 our payment was 281 *l.*; in 1864, which was the exceptional year which I spoke of, our payment was 1,416 *l.*; in 1865, 160 *l.*; and in 1866 it was 148 *l.*

2357. Then setting aside the year 1864, when you had to lay a large main, for the reason you have given, the average of your payments for the four years would be evidently under 200 *l.* a year ?—Yes; quite under 200 *l.* a year.

2358. It looks like being 180 *l.*; there has been some addition to the expense of paving there, I understand, by reason of the Pneumatic Dispatch tube and the main drainage itself, belonging to the Board of Works, having been added to the Holborn district ?—Yes.

2359. When the surveyor spoke about the amount of the recent paving being heavy, he should have stated that the Pneumatic Dispatch tube in

Holborn, and the Metropolitan Main Drainage Works, had added a great deal to the amount of paving disturbance in that district?—Yes.

2360. Of course that is quite exceptional?—It is quite exceptional.

2361. Then again, have a great many of the alterations of your own pipes in the last few years been caused by the construction of new railways and other works?—In many districts they have.

2362. In the Holborn district, which we are now speaking of?—In a small part of it.

2363. So that even that small sum of 180 *l.* of yours that year has been to some extent exceptional for that reason?—To some extent for that reason.

2364. Now, with regard to the size of the openings, what has been the average size of your openings?—The average size of all openings we have made during the past year for repair and alteration of our pipes has been under two and a half square yards.

2365. Mr. *Jackson.*] Will you give us the maximum and the minimum?—I cannot; but none are very large.

2366. The maximum may be very large in one street, and the minimum very small in another?—I think the average being only two and a half feet, they are in no case very large.

2367. Mr. *Denison.*] At any rate, if there has been a large maximum, that makes the minimum very small indeed?—Yes, very small; smaller than it possibly can be.

2368. I do not know if you have the number of times in which you have made openings?—I have not.

2369. Are many of them made at night?—In many of the leading thoroughfares, especially in the City, we make them during the night, or at an early hour in the morning, so as not to interfere with the traffic.

2370. I suppose very few of them interfere with the traffic?—Many of them are in the footways, which do not materially interfere with the traffic.

2371. I suppose hardly any of them interfere with it except over a very small width of street?—Only over a small width of street.

2372. And again, many of them are such as would have to be made even if there were subways?—All those openings that have reference to plugs, and cocks, and plug boxes on the surface, would require to be made even if the subways were introduced.

2373. Now, about the cost of maintaining and laying, opinions have been expressed here that there would be a great saving to the companies by inducing them to lay their pipes in the subways?—There have.

2374. Does that agree with your knowledge?—We have very little experience as regards laying pipes in subways; in fact, the New River Company have but that one instance in the Covent Garden subway; and it was stated during the inquiry of 1864, that the cost of that pipe was 65 *l.*

2375. Do you mean the laying of that pipe in the subway?—The laying of that pipe; the whole cost was 65 *l.*, and had that pipe been laid in the ordinary way, taking the contractor's prices, we should have paid for it 56 *l.*

2376. So that in fact it cost more in that case?—Yes; it cost more.

2377. Now then; the cost of maintenance; it has been also stated that that would be less?—It has been.

2378. Do you agree with that?—I think it doubtful, because although there will certainly be a saving as regards the pavements, for making good the pavement, and also a saving in the excavations, there would be extra expenses connected with the maintenance of the pipes in the subways, which would, I think, counterbalance the expected saving.

2379. Would you just go through those extra works, such as labour, and so on, which you anticipate would arise from the subways?—It must be at present a matter of speculation; but I think the trouble of getting the pipes into the subway, especially if they were crowded, would add considerably to the expense of making repairs; and there would be the use of artificial light, and other hindrances that would arise in doing the work in the inconvenient place in which the work would be required to be carried on, which would add greatly to the expense.

2380. I suppose that the one which was put down in Garrick-street was in a subway, where there was no interruption?—There was no interruption; it was pretty clear, there being only two gas pipes of six inches in diameter in it; we had room enough for our 6-inch pipe, which we had to lay down there.

2381. Now then, as to the artificial light that has been mentioned, have you considered the question of the reflectors, which has been brought before the Committee?—I think it would be a very imperfect light that could be obtained by the reflection of so much of the sun's rays as could be got down through those ventilating openings; I heard the suggestion made yesterday, by a witness, as to the use of a strong electric light; that would not be practicable; I rather think that that would blind the workmen, from the concentrated way in which it would come upon them.

2382. Those reflectors are to be from a light outside the subway, not inside the subway?—It is to be outside, and is to be reflected inwards.

2383. Whether that be right or not, do you believe that they could do without artificial light of some kind or another in anything but very bright weather?—It might be possible for them to work in very bright weather by some ingenious arrangement of the reflectors, but still the great objection to the use of artificial light, namely, the risk of explosion would not be overcome, inasmuch as for repair purposes, a fire, I think, would be needed still below.

2384. You mean that all these things would make the laying of the pipes cost more than it does at present?—I think the maintenance of the pipes would be a more expensive thing, including in the cost of maintenance, what would be most necessary, namely, constant inspection.

2385. Which somebody must pay for, at any rate?—Yes; which somebody must pay for.

2386. Now, to go to another matter; that is, as to the inconvenience of laying pipes in subways. I cross-examined a gentleman the other day about that, who seemed to think that I knew nothing about it. Let us see if I know anything about it. Crooked connections will, of course, have to be made in some places?—Wherever a main enters a subway, it will require to descend by a crooked connection to the bottom of the subway; when it comes out of the subway at the other end, it will require to ascend by a crooked connection, and whenever the main of a side street has to be picked up, there also will need to be a crooked connection.

2387. Did you avoid the line of Covent Garden subway, for the express object of avoiding those bends?—In the first instance, we avoided continuing the pipe laid down in that subway; it is a mere branch terminating in the subway; and subsequently when a large main connection was required between St. Martin's-lane and a point in the Strand, instead of getting that connection by reaching the main in Covent Garden; to avoid the subway in Garrick-street, the line of St. Martin's-lane to Northumberland House was taken, and that added a great deal to the length of the new main.

2388. There is another point upon which I cross-examined that ingenious gentleman, which was, about the crossing of the pipes, which I called "mains," and which he would call "trunks;" that would have to be done sometimes would it not?—It would have to be done wherever side streets entered the main street in which the subway was, and it would require also to be done for all communication pipes from our service mains on one side of the subway to the houses situate on the opposite side of the subway.

2389. Those are some illustrations of crossing and jointing pipes apparently (*exhibiting a diagram to the witness*)?—Yes; those appear to be the plans made during the last inquiry.

2390. Are they real things or imaginary things?—Real things; that I think is a representation of the pipes existing at the Mansion House.

2391. So that it appears if my learned friend makes me repeat the question, that that is a representation of real things?—Yes; both real pipes and real streets.

2392. I am afraid we cannot put that on the notes, and so I can only hand it to the Committee (*handing in the diagram*).

2393. *Chairman.*] Are all those pipes gas and water pipes?—Yes; gas and water pipes.

2394. In the earth?—In the earth; as they now lie.

2395. Are there no telegraph pipes in these streets?—Yes, there are; as shewn there.

2396. They are distinguished by the colour?—Yes.

2397. The telegraph is the yellow colour?—Yes.

2398. Mr. *Floyer.*] Was that plan prepared by you?—Yes, it was.

2399. Mr. *Duff.*] The water pipes are not shewn there, are they?—The water pipes are shewn blue.

2400. *Chairman.*] What is the size of the largest pipe amongst those?—A 19-inch main is the largest water main we have; the largest at that place.

2401. Mr. *Jackson.*] The largest pipe delineated on that plan, is 19 inches?—Yes; but we have larger mains elsewhere.

2402. Mr. *Paull.*] I would only ask what is the size of the mains to which you allude, as being larger than those?—We have mains as large as 48 inches in diameter.

2403. In the places where the 48-inch mains are placed, would they be interlaced about in the same fashion as they are shewn in that plan?—No; in no part of our district in which those larger mains are, are the pipes so interlaced as shewn in that drawing.

2404. Mr. *Denison.*] I suppose it is when you get to the moderate sized pipes that the greatest amount of interlacing occurs?—You want the greatest number of mains when the pipes are not of the largest description.

2405. I suppose when the mains are very big they occupy more room in the subway and leave less room for other things?—Yes, just so.

2406. This diagram seems to show the bend which you have been speaking of, in a vertical plane descending into the subway and coming up again?—This shows the bend in the Garrick-street subway.

2407. A bend downwards?—A bend downwards; this merely shows how the pipe in the Garrick-street subway has been made to descend into the Garrick-street subway; if that pipe had been carried further it would have required to ascend in a similar manner at the other end; but to avoid that difficulty the pipe was made to terminate in the subway.

2408. Mr. *Jackson.*] If the subway had been continued further, you would have lowered your pipe in the subway?—This is the subway (*pointing to the plan*).

2409. If the pipe had been continued for any length, you would have lowered your pipe, by degrees, downwards?—This is the bottom of the subway (*pointing to the plan*).

2410. There is a sudden bend?—That is the pipe, passing from St. Martin's-lane into the subway, it descends to that point.

2411. Supposing the subway went up St. Martin's-lane?—I would have descended at an earlier point to have reached the subway.

2412. Mr. *Paull.*] The pipe is, in fact, a shorter distance below the surface than the subway?—The usual depth of the pipe, below the ground, causes it to be considerably higher outside than in the position it occupies upon the floor of the subway.

2413. Mr. *Denison.*] Just to complete the plan, this shows the foreshortened, or front view of the same drop of those two pipes, and it also shows the fire-plug?—It does, being a section of the Covent Garden subway.

2414. *Chairman.*] Your great object, in all these pipes, is, not to have any-one at right angles?—We avoid bends as much as possible.

2415. Do you avoid curves?—Those bends I speak of are curves.

2416. I mean to say that a pipe at right angles would be worse than a curve; is that so?—On all occasions we would avoid a right angle; where one pipe passes off from another at right angles, the branch is made by a bend; but even a bend is objectionable in a pipe, and so much so that, in laying the pipes, we avoid the bends as much as possible.

2417. Mr. *Jackson.*] You find the friction greater in the case of bends, I suppose?—The friction increases considerably with bends.

2418. Mr. *Grove.*] Is it possible to avoid bends?—Not altogether

2419. Mr. *Denison.*] When you lay them in the old way, supposing a pipe coming along here in a wide street, and another wide street going across there, you make a very easy bend?—Yes.

2420. Whereas if you are confined in a subway, which is very much narrower than the street, and a street crosses the subway, you would have to make a very much sharper curve than you would otherwise?—Yes; and, morever, as the pipes are

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are now made, the bends of course are horizontal; but with subways, we should not only have those horizontal bends, but vertical bends as well.

2421. But I mean with a wide street, and a bend for a cross street, it is obvious that the bend may be as easy as that between these two streets shown here. Now, taking the narrower subway, it is obvious that the bend must be very much sharper?—In some cases the subway would require a very much sharper bend, besides having a vertical bend in addition.

2422. Mr. *Jackson.*] It depends upon the width of the subway; that would be obviated by making the subway larger, if the street commences at right angles?—The only difficulty then would be that if our pipe lay at one side of the subway, we should have to branch it off from that side, and we should have necesesarily a sharp bend in making that connection.

2423. Mr. *Grove.*] You always make your turns by a bend?—Always by a bend.

2424. Mr. *Denison.*] To take it in railway language, the radius of the curve could be no greater than the diameter of the subway if it is in a subway?—It cannot.

2425. Whereas, in a street, the radius of the curve may be as great as the width of the street?—Just so.

2426. I suppose, looking at that picture, the radius of the latter curve would be three or four times as great as the former?—It would.

2427. Now, about danger; I suppose you will agree with the other side that generally speaking pipes may be made tolerably safe, so as to avoid leakage for a considerable time?—Certainly.

2428. But, as yet, nobody has succeeded in making anything that will remain absolutely perfect for any very long time?—Nothing is absolutely perfect.

2429. The way in which leakage may occur is from negligence or by accident, and I am afraid we must add from wilful mischief?—Very frequently.

2430. Now with regard to the negligence; I suppose it is not very easy when there are different people occupying the subways, to ascertain to whose negligence the accidents are due?—I think it would be difficult; at present if an accident occurs it is generally pretty easy to trace it to its source; we know what company's mains are there, and what companys are liable; but in a subway where several companys have pipes, and where many have liberty of access, it would be very difficult to trace the accident to its source.

2431. I suppose one company's workmen would not care much about another company's pipes?—Not generally.

2432. If a subway is made and there are a lot of service pipes in it, and one company's pipes are laid across another company's pipes, the workmen would walk across them, and might do mischief to them though unintentionally?—Yes, not intentionally.

2433. Perhaps they might not know even if they had done it?—They might not.

2434. And even if they did they might not care?—They might not.

2435. Would the necessity of providing against those things, as far as possible, also increase the expenses of executing the works, and must you have a superior class of men inspecting?—I think there must be a constant supervision, and I gather from many of the remarks made by the promoters, and also others, that constant supervision would be certainly needed in the subways.

2436. More especially when new works are going on?—Yes, when works are going on and very often at other times.

2437. And wilful damage I am afraid, judging from what I have heard in another committee-room, that is a thing also to be provided against?—Yes.

2438. Have you found among the roughs of London a disposition sometimes to do mere mischief?—I think, especially in London, there is a desire to do mischief for mischief's sake.

2439. I know that the water companies in Mr. Ayrton's Committee, have been proving a great deal about that?—Yes.

2440. Now, with regard to the change of temperature, we had some tables given in yesterday showing what those changes are; knowing as we do the change of length which is due to the change of temperature, is that a source of leakage?—Yes; it is so even now while our pipes are protected in the ground; in the subway where the pipes are exposed, as compared with the position they have in the ground, if the ventilation is perfect the change of temperature would be very considerable, even greater than that which the returns for the Garrick-street subway exhibit.

2441. We will see why; the Garrick-street subway is not ventilated in the sense in which you think it would be required to be to begin with, is it ?—The ventilation is not perfect.

2442. That is to say, it is not sufficient to carry off an escape of gas if there was an escape ?—It is very variable; I have been down when the air was tolerably clear, and I have been down when the air was exceedingly offensive; the offensiveness not arising generally from the leakage in the gas pipes, because I believe the gas pipes have not had time to become very leaky, but the fumes that come up from the sewer below, especially at one end, are often very disagreeable.

2443. I dare say care was taken that they were not disagreeable this morning, and although I will assume it was all right this morning, have you found it sometimes anything but all right ?—Anything but all right; and this morning, I understand that the subway had the advantage of a longer and fuller ventilation than usual, by the flap of the side entrance having been opened at an early hour.

2444. Wherever there is that smell from the sewer, there is no effective ventilation to carry it off, is there ?—I mention that merely as a proof that the air is sluggish; the ventilation is not always very effective.

2445. In 1864 we had some evidence that the ventilation must actually amount to a wind that you could feel, in order to carry off the bad smell ?—In the case of a considerable leakage, you would require quite a wind to keep the subway so clear as to prevent the formation in it of an explosive mixture.

2446. My learned friend makes me hear him say, that you are not a gas engineer, but you are unwilling to have your water pipes exposed to the risk of what you believe will come from the gas pipes ?—We are not willing to have them so.

2447. You are not expecting the water to explode, I suppose ?—No.

2448. But you are thinking that your pipes might be damaged by an explosion of gas; that you might have the water let out ?—If the gas exploded, the water pipes would suffer.

2449. Your workmen may consciously, or unconsciously, do mischief to the gas pipes, for which you would be held liable ?—They might.

2450. Although you do not apprehend, for these reasons, any direct damage to the water, you apprehend indirect danger and expense ?—Yes, I do.

2451. Now there is another thing, although your water pipes alone were in the subways, still, if the gas pipes were outside the subways, it appears from the Paris experience, does not it, that the gas may leak into the subways ?—It appears so, not only from the Paris experience, but from experience in London; the gas finds its way from the surrounding ground, even into the sewers.

2452. And from that cause some of the worst explosions in London have happened ?—Some of the worst explosions in London have happened.

2453. If that was so, of course your pipes would be destroyed ?—If they were in a subway which exploded from that cause.

2454. The consequence of that would be very serious indeed if a large main in the subway were to be broken ?—The consequences, of course, in the matter of water supply would be very serious, but an explosion in the subway would probably issue in tearing up the street, and a loss of life, which would be more serious still.

2455. But I am talking of your water interests just now; that is one of the reasons why you dislike being driven into the subway, even if the gas pipes were kept out ?—It would be a serious inconvenience the interruption of the supply to a large district by the breaking of the main from an explosion in the subway.

2456. Is it extremely difficult to ventilate the side passages, and to keep them clear, even supposing they could carry a wind through the main subway; would the air still be dead in the side passages ?—As things are in the side passages in the Covent Garden subway, there seems to be no provision at all for the ventilation of the side passages.

2457. Of course, when the vault at the side happens to be quite open, there may be provision for ventilation, but under ordinary circumstances the vaults are not open ?—The vaults are not open.

2458. Supposing you were moving your pipes into the subway, how would you carry on the water service during that time; would you duplicate the set of pipes ?

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pipes?—The most efficient way would be to duplicate the set of pipes laid down as a temporary arrangement while the old pipes were being removed and the new ones laid down.

2459. That would be a considerable increase of the cost, would not it?—Yes; it would.

2460. I have got another diagram, which subway is this, this is Cheapside?—There is no subway in Cheapside; that is an imaginary subway.

2461. Those are the pipes actually in Cheapside?—The pipes actually in Cheapside surrounded in that drawing by a subway of the same sort, as the subway in Garrick-street.

2462. This thing shows what Mr. Jones would not choose to understand, when I put it to him, namely, a junction of a cross main with a main of the same size; this shows the small mains going across so-and-so reciprocally, and then here are upright ones going to the fire cocks in the streets, I suppose, and that is a main (*pointing to the diagram*)?—Yes.

2463. That does not appear to me to show the small communication pipes to the houses, does it?—No, they are omitted; they would add to the complication of matters.

2464. Those are just the things which would be most likely to be damaged from people walking through the subways and doing their work, would not they?—The small pipes would.

2465. Because they are weak?—Yes.

2466. They are of lead, are they not?—The water communication pipes are of lead.

Cross-Examined by Mr. *Cripps.*

2467. What is the object of these plans; to show how inconvenient the subways could be constructed?—The object of that plan was to show that with the pipes in Cheapside, you would find the greatest possible difficulty in making accommodation for them in the subway.

2468. Am I right in reading the heading of this, "Showing the insufficient accommodation which a subway having the area of the Southwark-street and Covent Garden subway would afford for the pipes which now lie in Cheapside"?—Yes, quite right.

2469. Do not you think that if anybody is going to make a subway in Cheapside they would make it for the requirements of Cheapside, and not for the requirements of Southwark-street and Covent Garden?—No doubt they would.

2470. And the object of this is to show how a thing which can be applied to one case cannot be applied to another?—In order to show that in Cheapside the expense which would require to be gone to would be infinitely greater than the expense in Southwark-street or Covent Garden.

2471. Is it not rather to show the absurdity of any engineer who would think of laying down a subway in Cheapside for one state of circumstances precisely the same as in Covent Garden or Southwark-street for another state of circumstances?—I do not suppose any engineer would do so; but still that plan shows the difficulties you have to contend with, and how those crossing pipes would, even with a larger subway, be very much in the way.

2472. Did you ever know an engineer who was not scientific enough to suggest difficulties in a hypothetical case?—Difficulties are very easily suggested.

2473. I will call your attention to one suggestion; this is a plan that is drawn and put in before the Committee to illustrate the difficulty that the pipes in the subway at this point would present, I suppose?—It is drawn simply to show the position of the existing pipes.

2474. Does it not show as laid in the same street now the pipes of three different companies?—I believe it does.

2475. Do not you know that London is districted so that there is only one company supplying each particular district?—That may be, but still the pipes of one company have to pass through the district of another company, and hence you may have, notwithstanding the districting to which you allude, the pipes of several companies in the same street.

2476. *Chairman.*] That is with reference to gas?—That is with reference to gas.

2477. Mr. *Cripps.*] First of all, as a general rule, it is the law now that each particular company supplies a particular district is not that so?—It is so.

2478. I am quite aware that a certain state of things existed when that law was enacted, which has not been altered; and that, in one particular district, where this is taken from, there are still two or three companies supplying one district; is not that so?—I believe, in the City, there are two.

2479. You have selected this as an illustration, to the Committee, of what would take place throughout the metropolis, illustrated by one particular district which, from the circumstances which were existing when the law was passed, the law does not apply to?—I did not make the selection of that spot to show what would generally take place; but there is a proposal to bring up in a new street, a subway to that very point, and I wanted to show the difficulty you would have there to contend with.

2480. Is it necessary now, in any district, that there should be more than one gas company to supply that district?—It is not necessary that there should be more than one gas company to supply a district; but it may be necessary for the pipes of more than one company, or even more than two companies, to pass through the same place.

2481. And there may be three; but, as far as complication is concerned, the supply will be by only one company supplying one district?—

Chairman.] What is the number of pipes there?—

Mr. *Cripps.*] The fact is this, that before the districting passed, there were three companies supplying that particular district, and when that districting was passed, the district was left in the possession of those companies.

Mr. *Richards.*] That does not apply to the City of London.

Chairman.] How many pipes are there altogether?

Mr. *Cripps.*] There are three sets of pipes here.

2482. *Chairman.*] I want to know how many pipes there are?—In the line in which they appear to be most numerous here, there are 10 lines parallel to one another; and in some places where they interlace, they are yet more numerous.

2483. Mr. *Jackson.*] Those were laid under the old system, before the District Act passed?—It is simply to show the existing pipes.

2484. *Chairman.*] There are two pipes, and the largest pipe is a 10-inch pipe?—A 19-inch pipe.

2485. Mr. *Jackson.*] Do you know the largest gas main there?—I think I would rather leave that to the gas engineer.

Mr. *Cripps.*] There are upon that plan the pipes of three distinct gas companies laid down, are there not?

Mr. *Denison.*] The largest gas main, I am told, is a 36-inch at present.

2486. Mr. *Cripps.*] Just attend to his Lordship's question; are there not upon that plan which you have given to the Committee as an illustration of a future state of things, the pipes of three distinct companies?—There are the pipes of three distinct companies, but this plan, I still say, is not to exhibit a future state of things, but an existing state of things.

2487. What is the use of it as an illustration to the Committee, except showing what would be the state of things in future subways?—To show the difficulties for which you have to provide.

2488. That is the only answer you can give; is that a state of things which you would contemplate as probable or possible in any of the subways laid down now?—No; I think those pipes would require to be altered most materially before they could have admission into the subways.

2489. How came you to select that one particular place from all London, where these three companies are still in existence?—Because up to that point it is proposed to bring one of the subways you mention in your Bill.

2490. And that was the reason you selected that particular point; do you assume that they would all have to be laid down if the subway was made without

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out any re-arrangement?—I assume that there would be an entire reconstruction of the pipes if the subways were brought there.

2491. Are those pipes which you have supposed to be laid down, pipes laid down at different dates by the different companies when they were in competition?—I suppose in regard to gas companies that would be so, but on that point I prefer you to take the evidence of the gas engineers.

2492. Now about the cost you have given as of laying down the water pipes; you have computed the cost of laying down for these experiments in Garrick-street, with the cost of laying down in some other place; I think you gave us 56 *l.* instead of 65 *l.*?—I compared the cost of laying down the pipe in Garrick-street with the cost which a pipe of the same length, and in the same place, would have occasioned, laid in the usual way.

2493. Do you consider it fair to take the cost of a pipe laid down experimentally there, with the average cost of your pipes as laid under the existing system?—I think so.

2494. When you lay your pipes, generally is that not done by contract?—It is.

2495. That is so; they are laid by contract?—Yes, they are laid by contract.

2496. You took the contract price on the one side?—I did.

2497. When you laid them for those experiments in Garrick-street, was it done by day work?—It was done by day work, at the contract price.

2498. But it was done by day work?—Yes, done by day work, under the strict supervision of the company's own inspector.

2499. And the other was done by contract?—Yes.

2500. I see, in some evidence which was given by you in 1864, there is a "Statement of the cost of providing, or laying, a line of 6-inch pipes, with connections, from a man in St. Martain's-lane into and along the subway of New King-street, Covent Garden;" that is the same, I suppose?—Yes.

2501. Now, you have given the particulars of those, was that done by day-work?—It was; and I think I explained when that return was handed in that it was done so unavoidably.

2502. I do not say whether unavoidably or otherwise; have you got the cost of the hydrant in your subway among the particulars?—I have.

2503. Have you got the cost of the hydrant in the other which you compare it with?—In the one case the hydrant is included, in the other a plug.

2504. You have got the cost of the hydrant in the one case, and you have not got it in the other?—I have got what is equivalent in the other, a fire-plug.

2505. "Screw-cock as in subway," that is here. I do not see any cost as against the hydrant; perhaps you would like to correct me; I think you are mistaken, but it is very unimportant. "Cock and plug-boxes and plugs," have you got that in the other?—Not a plug.

2506. "Cock hydrant and plug boxes, 15 *s.*"?—The one is an equivalent for the other.

2507. Supposing you had to lay any length of your pipes in the subways, should you not do it by contract?—I have no doubt we could get contract prices if the subways were constructed, and the contractors had some experience as to laying in them.

2508. Now as to what took place in Gray's Inn-road you said you could not avoid breaking up the streets two years afterwards, for the purpose of doing that which you could not do at the time for some reason, was not that so?—It was so.

2509. Is not that a thing which would be constantly occurring that you cannot tell at the time that a particular street may be repaved, what your requirements are, and therefore it is unavoidable that you may have to break it up just as it is laid down?—It may be that we cannot foresee for three or four years the works that are to be done, all I wanted to do was to show that this particular case was an expressly exceptional case.

2510. You mean to say that you were not to blame, and that it was inevitable according to the present sytsem?—It was not inevitable, inasmuch as the company might have refrained altogether from making this great public improvement.

2511. That is to say, that if the company are to do their duty, it is an inevitable thing?—Just so; I think that the company would not have been justified in refraining

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fraining from carrying out that great work merely because three or four years before they were not able to do so in answer to a short notice from the Board of Works who were about improving that pavement.

2512. We are quite at one there; as long as the present system continues it is inevitable that you cannot foresee what your wants are, and where a street has been relaid, you may have to break it up immediately afterwards?—"Not immediately afterwards;" the notice was in 1861, and the work was done in 1864.

2513. I see the evidence here is, that in the year 1862, the District Board at great pains repaved with new stone and concrete the carriage way in Chancery-lane, and that within about 12 months afterwards, the company entered upon it, and took up its entire length, and they are now dealing with the carriage way of Holborn in a similar manner; do you supply Chancery-lane?—Yes.

2514. Is this a fact, that in 1862 the District Board, at great pains, repaved with new stone and concrete the carriage way in Chancery-lane?—I believe they did.

2515. And is it also the fact, that within about 12 months afterwards a company, that is, your company, entered upon it, and took upon its entire length?—Part of the lane.

2516. I do not care about the word "entire," but is that the fact?—I admit that to be the fact, but still I repeat that that ought not to be cited as what we are in the habit of doing, inasmuch as the work was of an entirely exceptional character.

2517. It was within 13 months after the street was laid?—Perhaps it was.

2518. And they are now dealing with the carriage way in Holborn in the same manner; that was in 1864 that you were doing that?—That is all the same main.

2519. You do not do these things for the sake of wilful mischief; they are inevitable; you cannot help them?—Not if we are to do our duty.

2520. Did you hear Mr. Easton give his evidence yesterday about the pipes?—Yes.

2521. Mr. Easton is a gentleman of very great experience, is not he?—I think he is.

2522. You do not agree with him?—In what respect.

2523. Do you know what Mr. Easton said?—I heard his evidence.

2524. About price?—He gave the price.

2525. Do you agree with him?—I do not agree with him in this respect, that we cannot get work done for the price he named.

2526. Would not Mr. Easton be a perfectly responsible contractor to undertake such a work is my question?—I think he would.

2527. Did you hear him say that he would undertake to put it down by contract at a certain price?—I heard him say so; and I gathered from his remarks that he was prepared to do such a work at a much more moderate price than his brother contractors.

2528. Did you hear Mr. Easton give the comparative prices of laying in the subways and laying in the streets?—I think I did; but I do not remember what the difference between the two prices was.

2529. I dare say you remember, generally, about what the difference was; was the cost of laying in the subway, in his opinion, according to his experience, much less?—He made it out to be less.

2530. Is not he a person of considerable experience?—Of considerable experience I grant; but I think he based his calculations upon a case not altogether similar to the case of the Covent Garden subway, inasmuch as the pipes laid in the Southwark-street subway have not a connection, at the end, with the adjoining pipes; they have no hydrant branch from them, and, therefore, in certain respects, they do not include all the charges included in the estimate for the subway in Garrick-street.

2531. Were you here when he gave his experience?—I was.

2532. Were you instructing your counsel, who conducted the cross-examination?—

Mr. *Denison.*] We are not instructed by witnesses, but by the solicitors.

2533. Mr. *Cripps.*] You did not give any instructions about cross-examining Mr. Easton, although you heard him cross-examined?—No, I did not.

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Re-examined by Mr. *Denison.*

2534. At any rate, you tried to get your work done at Mr. Easton's prices, and you could not?—We could not; and I may say, in reference to that comparison, which you had from me, of the price of work done in one way, and the price of the work done in the other way, that the proportion between those two would still show you the proportion of cost, whatever contractor you employ for the two kinds of work.

2535. Now, about Cheapside; the reason you selected that particular place is that a subway is coming there now?—Yes; through the new street to the Mansion House.

2536. Therefore these pipes, or the substitutes for them, will have to be provided for in some way?—I suppose so.

2537. Now about districting, there are in the City in many places, the pipes of several companies still lying down by Act of Parliament, are there not?—I believe so.

2538. The districting which we have been speaking of, does not practically apply to the City?—Not to the City.

2539. So that in that place, there will still be the remains of those two gas companies, or possibly three gas companies to provide for?—Yes.

2540. My learned friend thought he had got you in using the phrase, "difficulties," have you any interest in making difficulties upon the subject?—None at all

2541. Should you not be very glad if you were satisfied that there were not any difficulties, if you knew the thing could be safe?—I think the companies if they could only be satisfied that there was not some serious risk attending the use of subways, would be the first to welcome their introduction.

2542. Those instances of breaking up the streets are all summed up in the average of 180 *l.* a year, which you gave in the beginning?—They are summed up on the average amount paid to the Holborn Board of Works.

2543. The evidence upon which has been given by Mr. Isaacs?—Yes.

2544. So that when he goes through those instances he has given, they are all included in that average?—Certainly.

2545. Mr. *Cripps.*] It is 180 *l.* average, striking off the exceptional year?—Striking off the exceptional year.

2546. Mr. *Bagwell.*] Supposing as an engineer, you were laying down a new town in America, would you lay subways, or would you have the streets cut up in the sort of way you see here now?—Though I admit the cutting up of the streets for the sake of getting at the pipes as they are now, is a great disadvantage, and one which the public would be very glad to get rid of, and the companies too, yet the risk of having a subway liable at any time, we cannot tell when, to a terrific explosion, makes it appear to me that it would not be a justifiable thing, even in a new town to arrange for their introduction.

2547. You go in for explosions, and you say that it is liable at any time to explosions?—That is what I fear.

2548. Supposing explosions and all that sort of thing out of the question, do you wish the Committee to understand that it would be a cheaper thing to dig down three or four feet, as the case may be, and lay pipes in the streets than to lay them down where you have the place straight before you, and plenty of light, and convenience for laying them down?—So far as our experience has yet gone, I feel that there would be no saving to the companies in laying the pipes, or in maintaining them in subways, but I think the companies would treat that matter as quite a secondary thing, even though the cost was somewhat greater; I do not think that for the sake of a great public work, the company would stand very much in the way if they were perfectly assured that there was no risk of explosions happening in the subways.

2549. Do you mean to say now, that if you wanted to lay a pipe along this room, it would be cheaper for you to cut into the floor than to lay it upon the carpet?—Certainly not under those circumstances.

2550. *Chairman.*] You said that there would be "terrific explosions" in the subway; do you think that every explosion that would take place in the subway would be terrific"?—Not at all, slight explosions there might be, but I think the risk of there some day being a dreadful explosion ought to cause the companies to hesitate.

2551. Mr. *Bagwell.*] Do you think that there could be a terrific explosion unless there were some vicious people stopping up the ventilation for the purpose of causing an explosion?—I think that there are certain states of the atmosphere where, with all the provisions that you could make for ventilation, there would be next to no motion in the air of the subway, and if at that time there should be a large escape of gas occurring through accident, in all probability when next a light was introduced, an explosion would occur.

2552. Must not the gas flow upwards as naturally as water flows downwards as a matter of fact?—To speak of gas passing through air as air does through water is not correct; the tendency of gas and air is rapidly to mix with one another by diffusion.

2552*. Mr. *Floyer.*] Do you think that pipes, when once well laid in a subway, would receive any injury from blows, or other circumstances requiring anything like reparation, within a considerable period?—I do not think that pipes, even laid in the usual way, are likely of themselves to leak, or become troublesome at all for many years, and it may be that their being laid in the subways would give them some additional security; all that I am prepared to admit.

> Mr. *Richards*] Something was said yesterday as to the liability in cases of accident; this Witness can speak to particular circumstances with regard to the Metropolitan Board of Works, and the Metropolitan Railway Company, and the New River Company, if the Committee choose to ask the question; it is about the accident at the Fleet sewer, and the difficulty of ascertaining where the proper liability attached, out of which disputes have arisen.

2553. *Chairman.*] Was that from gas or water?—Not at all; the point I believe to be this merely, that where several parties were concerned, there would be a great difficulty in fixing responsibility. Some years ago, in consequence of the construction of the Metropolitan Railway, there was a fall of the retaining wall in the construction of the railway adjoining the Fleet sewer; there was a fall, and the Fleet sewer was involved in the ruin that took place, and also some of the New River Company's pipes were destroyed, and for five years a settlement of this point, as far as the New River Company is concerned, has not been found possible.

> *Chairman.*] It is merely his own opinion as to the question of responsibility.

> Mr. *Richards.*] The Witness will tell you a story of the extreme difficulty of fastening legal liability on the different parties; my learned friend yesterday asserted that it was the easiest thing possible to ascertain; my learned friend said that it might be left to the ordinary operation of the law, as if that was the easiest thing in the world; here is a case that illustrates that.

> Mr. *Jackson.*] This is a case that has occurred outside the subway.

> Mr. *Richards.*] Yes; it has occurred outside the subway, and might just as well have occurred inside.

2554. Mr. *Paull.*] Are you concerned for the New River Company?—Yes; I am the New River Company's engineer.

2555. An accident occurred, by which some of the New River water pipes were broken?—Yes.

2556. Did the New River Company bring an action against the Railway Company?—They threatened an action latterly after long negociation.

2557. There was an attempt between the New River Company and the Railway Company to come to a settlement by private negociation?—There was.

2558. Was it successful?—It was not successful.

2559. Was the action brought?—It was brought.

2560. What was the result?—It is still pending.

2561. And that has lasted between five and six years?—The negociation and threat of action have lasted five or six years.

2562. What was the difficulty as between the two companies to arrive at a settlement?—I believe the difficulty was to say whether the Board of Works, as the

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the owners of the Fleet sewer, or the Metropolitan Railway, as the constructors of those new works, were the cause of the accident.

2563. So that there were three parties concerned; the New River Company, the Board of Works, and the railway company?—Yes; and the New River Company, as mere sufferers, were unable to obtain from either of the other two parties compensation.

2564. So that in effect you had to struggle with one public body, and one private one?—Yes.

2565. And you found they beat you?—We have for six years remained with the thing unsettled.

2566. What was the damage done?—About 1,000 *l.*

2567. Mr. *Paull.*] How much has all this negociation cost during these five years to the New River Company?—I do not know what the negociation may have cost, but the whole claim of the New River Company is 1,000 *l.*

2568. Do you mean in respect of the original damage?—In respect of the original damage.

2569. That is without counting the cost of the endeavour to recover the damage?—I believe there are in that sum included costs for the interest of money that has been withheld.

2570. Has your company ever been engaged in an arbitration on account of the damage occurring to their pipes?—No.

2571. *Chairman.*] Do you think that a matter of this kind should be settled by arbitration?—Probably it might, but we were so entirely in the hands of the other two parties, that we had to wait till they settled between themselves.

2572. Mr. *Grove.*] Are you now using the Covent Garden subway?—Yes.

2573. Previous to your going there, were you consulted upon it?—Not at all; the subway was constructed without any consultation with the water engineers or the gas engineers, and when we were first asked to lay our pipes there, it arose in this way; the houses were built, and the owners of those houses wanted to have a supply of water; our company then made application to the Board of Works officers, and also to the officers of the parish, to know in whose jurisdiction this subway was; we were ultimately told that it remained entirely in the hands of the vestry, and to the vestry we made a representation; our inspector attended the meeting of the vestry, and pointed out what the company's objections were to the use of the subway; ultimately the New River Company agreed to lay their pipes there only experimentally, thinking that as the thing had been made, they would not stand in the way of a trial of what was at least viewed as a great public improvement, and moreover as they found that the gas company had preceded them by laying the gas pipe in the subway, the risk of explosion they felt was already there, whether the New River pipes were laid in the subway, or on the top of it.

2574. Mr. *Duff.*] In your opinion, you incurred a risk and responsibility in this subway?—We incurred a risk, but we could not help ourselves, because the risk had been brought into the place before our pipes were laid.

2575. Mr. *Floyer.*] Have you ever had to repair your pipe?—Never to speak of; there was a slight repair, immediately after it was laid, in consequence of an inequality of pressure upon the pipe passing through the end wall of the subway. The pipe, which split, had to be plated over, as the easiest way of making the repair.

2576. There having been no repairs since?—None since.

2577. Mr. *Duff.*] Have you found any inconvenience in having your pipe in the subway?—Not yet.

2578. How long has it been there?—Four years.

2579. You spoke of the great expense of artificial light?—I mentioned that as one of the items of expense.

2580. Have you seen the way in which the subway is lighted in Southwark-street?—I have not.

2581. There does not appear to be much expense attending what we saw to-day; it was very well lighted, I thought?—

2582. Mr. *Rodwell* (*through the Committee*).] Did not the Board of Works recover at once, against the Metropolitan Railway, for the damage done by the breaking in of this sewer; did not they recover 1,000 *l.*?—I do not know; we could not get the matter settled.

2583. How long were you negociating?—During the whole period.

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2584. I do not ask how long you were before you brought your action; but how long were you negociating?—From the time of the accident up to the present time.

2585. You have negociated for a long time, and it is only lately you brought the action?—It is only lately the action was brought.

2586. Because you could not negociate satisfactorily; you might have brought the action at once?—Yes.

2587. You brought the action against whom?—Against the Metropolitan Railway.

2588. What was the reason for delaying it?—The action was not brought against the Metropolitan Railway until it had been decided that the Metropolitan Railway were the responsible parties.

2589. *Chairman.*] Who decided that the Metropolitan Railway were the responsible parties?—I do not know; we waited till the matter was settled between the Metropolitan Railway and the Board of Works.

2590. Mr. *Rodwell.*] You waited till the Board of Works brought their action against the Metropolitan Railway, and directly you found that the Metropolitan Railway were the responsible parties you brought your action?

2591. Mr. *Richards.*] Was that so?—I believe it was.

2592. Mr. *Paull.*] In fact you avoided litigation as long as you could?—We did.

2593. Mr. *Richards.*] And it has lasted five years?—

Mr. *Rodwell.*] A negociation might last for 20 years; but in this case, directly the negociation ceased, they brought their action.

[The Witness withdrew.

Mr. *Thomas Everson Forster,* called; Examined by Mr. *Richards.*

Mr. *T. E. Forster.*

2594–5. Are you a Mining Engineer of Newcastle-upon-Tyne?—I am.

2596. Are you President of the North of England Institute of Mining Engineers?—I am.

2597. And a member, I believe, also of the Institute of Civil Engineers?—I am.

2598. Have you had experience as a mining engineer for the last half century?—I have.

2599. Especially with reference to the working and ventilation of mines?—Yes.

2600. Were you one of the engineers called in upon a late occasion with reference to the Oaks Colliery accident?—I was.

2601. I believe that you have had as large experience upon the matter of the ventilation of mines as any gentleman in the north of England?—I believe I have.

2602. Have you inspected the subway which is existing in Garrick-street, Covent Garden?—I have.

2603. When did you inspect it?—Yesterday.

2604. Did you inspect also the side passage which led from the subway to the houses, right and left?—I did.

2605. Did you take a candle with you?—I did.

2606. Was it sufficiently dark to require you to take a candle, or was it merely as a matter of experiment?—It was sufficiently dark to require a candle.

2607. What time of day was it?—Eleven o'clock in the morning.

2608. Did you bring your experience to bear in order to ascertain what the circulation of air was in the subway?—There was no circulation of air yesterday.

2609. There was no circulation of air?—Not the slightest.

2610. How did you ascertain that?—By holding the candle up, and the flame of the candle did not waver in any way whatever.

2611. Did you try it high up in the subway, as well as low down?—Up to the top of the arch, and at the bottom, and the centre.

2612. Did you also try it near the gratings or ventilating shafts?—I did.

2613. With the experience which you have had in the matter of the ventilation of mines, do you give it as your opinion that there was a proper ventilation or not in that subway?—Certainly not; there are no ventilating places at all.

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The little two feet square pits, as you may call them, would not give you any ventilation whatever.

2614. The little ventilating pits would not give you any ventilation whatever?—Not the slightest.

2615. There were gas pipes, I believe, in the subway?—Yes; on one side of the subway, and on the other the water pipes.

2616. With a certain number of service pipes from them?—Yes.

2617. Supposing an escape of gas to take place from the gas pipes in the subway, do you conceive that there is sufficient ventilation in the subway to carry off the gas?—By no means, and it could not be got under existing circumstances.

2618. The length of the subway, I believe, is about 320 feet, is it not?—Three hundred and twenty feet.

2619. Being about 12 feet wide and 6 feet high?—Six and a half feet high.

2620. Should you say, as a practical man, that the risk of an escape of gas in the subway rendered it dangerous?—Very dangerous indeed.

2621. Gas we know, mixed in certain proportions with atmospheric air, is extremely explosive?—Yes.

2622. Gas escaping, naturally rises above the atmospheric air, I presume?—Yes, being lighter than the atmosphere, of course it naturally rises.

2623. But in rising does it rise with a sort of diffusion?—Yes; it will mix with the atmospheric air.

2624. The same as you sometimes see the smoke of a cigar mixing with the air?—Yes.

2625. It does not rise as air does through water, in a perpendicular line, and making a bubble?—Certainly not; it diffuses itself through the air.

2626. Do you agree with Dr. Franklin that the explosive mixture ranges from 1 in 13 to 1 in 6 or thereabouts?—No; my experience is from about 1 in 4 to 1 in 14, the most explosive mixture being about 8 or 9 volumes of air to 1 of gas.

2627. About 8 or 9 being the most explosive?—Yes.

2628. I understand you to say that, in your judgment, the subway, if an escape of gas took place, would be dangerous?—No question of it.

2629. Did you test the subway with a thermometer?—Yes.

2630. What did you find it at eleven o'clock in the forenoon?—58.

2631. I suppose yesterday morning outside the temperature was very much higher?—I cannot say; but I should think it would be upwards of 70.

2632. What would be the result of that as to ventilation?—The result was exactly what I expected, that the heat of the air on the surface being greater than the air in the subway, the air would not ascend at all, and the warm air would not go down.

2633. What would be the effect of that upon the ventilation of the subway?—Simply that there was none.

2634. Did you examine the apertures of the gratings?—I did.

2635. You have told us that in your opinion, these square pits are inefficient?—A circle two feet in diameter, is equal to about three decimal one of area, but when you take the grating off, there is not quite three quarters of a foot area for the air either to escape or go down.

2636. I put it to you again, do you consider that that is sufficient to allow supposing an explosion to take place of the escape of the ignited gas?—No.

2637. Looking at that subway, what would be the effect in your opinion of an explosion upon the subway?—If there was a quantity of gas to escape it would blow up the arch in the street and kill people, and destroy property to a considerable extent.

2638. You think it would do something more, besides sending a flash of flame through the ventilators, it would destroy the arch?—It would blow the street up.

2639. Do I understand you to say that an escape of gas in that subway, would be likely to produce that effect?—There is no question about it.

2640. It would be insufficient to carry it off?—If it could not escape it would burst it at both ends, it must get out somewhere; or rather it would blow the arch up.

2641. In your opinion there is a total want of ventilation; is there any mechanical

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mechanical means by which a ventilation could be created?—The only way to keep the subway free from the gas, is either by a fan or by a furnace.

2642. Those are the plans adopted in mines?—Yes.

2643. Mr. *Jackson.*] By a ventilating shaft?—Yes; and upcast and a downcast shaft.

2644. Mr. *Richards.*] You would require a long shaft?—It would not be very deep.

2645. I understand that that is the process by which you produce artificial draught in one direction always, is not it?—Of course.

2646. Could that be produced in a subway except by some such means as you describe?—No, it could not; it was proved yesterday that the natural ventilation was not sufficient to produce air in the subway, without any mechanical means.

2647. You satisfied yourself yesterday, that the natural ventilation was not sufficient to give sufficient air to the subway?—Yes.

2648. I should presume that what you have said as to the subway would equally apply to the side passages?—It will be more dangerous in the side passages because there can be no ventilation there at all.

2649. I believe that there are some shafts coming up under the kerb in the side passages?—It comes up into the middle of the street.

2650. Mr. *Bagwell.*] How many ventilating shafts would you mention that you think would be necessary?—That would depend entirely upon the distance; I should think one downcast and one upcast in two or three miles would be sufficient.

Cross-examined by Mr. *Rodwell.*

2651. I understand that you give this evidence upon the assumption that there is practically no ventilation whatever in these subways?—There is none; there was none yesterday.

2652. I must ask you, as you say there is none, what do you mean by "ventilation?"—I mean a current of air being carried along the subway to sweep away any gas that might escape fron the pipes.

2653. Do you mean to represent that in your view it is necessary there should be a current of air in order that the gas may escape?—No; I say that if the gas does escape, it is necessary to have sufficient ventilation to sweep it away as it escapes.

2654. Must not that depend entirely upon the extent of the escape?—It does not require a great deal of gas to make a very dangerous explosion.

2655. Do you think with regard to a small escape of gas, a cubic foot an hour for instance, that there is not ventilation enough to carry that off?—Certainly not; if that goes on for 24 hours it would blow up.

2656. Do you mean that the gas would not find its way out of the openings of its own accord?—Certainly not; it would not indeed.

2657. Not unless there were a draught?—There is no place for it to escape; those little bits of openingsof three-quarters of a foot area are not sufficient to carry it off.

2658. You told my learned friend that the gas would diffuse when it escaped from the pipe?—Yes.

2659. And that it would not go like he said a bubble of air from water, but that it would diffuse and disperse itself among the surrounding air. I suppose the result of that is that although it does diffuse itself it brings the air with which it mixes itself up to the surface; is not that so?—It goes towards the top of the arch.

2660. Does not it go necessarily to the place where there is an opening?—Suppose there was this gas and it was to diffuse itself amongst the air it would make it more dangerous.

2661. *Chairman.*] If the gas escapes, where does it remain?—It would remain in the subway, unless it was carried away by a current of air.

2661*. What part of the subway?—Through the whole distance of 320 feet.

2662. Mr. *Rodwell.*] You will excuse me puting this to you, but it is so contrary to what well-informed people have told us, that I must do so; it is the misinformation of others if I am wrong; but do you mean if there was nothing but the aperture there, no draught or current of air in there; do you mean if there

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there was an open hole at the top of that subway, that the gas would not find its way sooner or later through that aperture?—It would have just as good a chance of finding its way along the subway for the whole distance, as it would to go up to the aperture.

2663. I will take a simple illustration; take a barrel full of gas with the bunghole open at the top, what would become of the gas?—You might light it if there was no air going into it.

2664. No draught in the barrel with the bunghole open at the top; if it were filled with gas and air, I ask, will not the gas escape?—Not without air.

2665. Do you assume that there is no air in the subway at all?—Sometimes there would be a little, and sometimes there would be none; yesterday there was none.

2666. Mr. *Floyer.*] By "air" you mean a current of air, I presume?—Yes.

2667. Mr. *Rodwell.*] Do you mean that if air and gas were put into a barrel and the top were taken off that barrel, or a hole made in the top of that barrel, the gas would not sooner or later disconnect itself with the other air and disappear out of the barrel?—It would come out of the barrel, but it would diffuse itself.

2668. If it would come out of the barrel, why should it not come out of the subway?—I am always taking for granted that you mean that barrel to be in the subway.

2669. In this room, or anywhere you please?—It would depend upon the size of the barrel. I should not like to be in the room if it was a very large barrel.

2670. I put a barrel in this room, and put a quantity of gas in that barrel, and I will then make a hole in the top of that barrel, what will become of the gas in that barrel?—You would get some of it into your lungs.

2671. Will it come out of the barrel?—Yes.

2672. If that is the case as applicable to a barrel, I want to know what is the difference between the barrel and the subway?—I say if a pipe was to break or there was an escape of gas.

2673. Pray do not put the breaking of a pipe or anything like that. I am asking you simply as to what would become of the gas in the barrel, and whether I have been rightly told by Dr. Franklin or not, that it will find its way out?—It will find its way out of the barrel, but it must go to some place.

2674. If it got to the grating of the subway, would not it find its way into the air all over London?—A portion of it might go out of the grating, but the great bulk of it would go along the subway.

2675. Would not it, of necessity, go up the grating; does not gas ascend, according to you?—It does.

2676. If gas will ascend wherever it can, and there is an opening with no top to it, it seems to me to be rather an inference that the gas will find its way out of that aperture?—I admit that a portion of it would.

2677. Why should not all of it?—If there is a space for it.

2678. Would not that depend upon the quantity of gas; do you assume that an 18-inch main would burst?—Supposing a 6-inch main were to burst, and it was to go on till there was 500 cubic feet of gas in the subway, that, mixed with eight times the bulk of air, what would be the consequence of that; why an explosion.

2679. I will agree with you there; you reason upon the danger here from the analogy of cases you see in the coal pits?—It is exactly the same.

2680. Is not it the case that the gas lodges in what you call the pockets of the mines, the roof of the mine?—That entirely depends upon the quantity of gas that is issuing out.

2681. Does not the gas, when it issues out, come with a considerable pressure upon the coal?—No; it comes out easily if you find a large blow-hole.

2682. That is what I was coming to, a large blowing; it comes out with immense force?—Yes.

2683. A much greater force than it would come out from a gas-pipe in the subway?—That would entirely depend upon the pressure in the gas-pipe and gasometer.

2684. Do you know the pressure upon a gas-pipe?—No; I cannot say exactly.

2685. It would be difficult for you to say whether it was stronger from the coal than it is from the pipe?—I have known of an instance——

2686. You do not know whether it is 20 lbs. to the inch in a gas-pipe?—No; I do not.

2687. You have no idea of that at all?—No; I have not.

2688. Is it the fact that many mines are worked in Staffordshire with nothing but what we may call natural ventilation, without any artificial blowing-fans or furnaces?—I am not aware; but I should think not.

2689. Do you mean, in your experience, you do not know that?—I should think not.

2690. I understand you to say that your belief about subways is, that if artificial ventilation were introduced by a fan, they might be kept safe?—They might be kept safe if there was no carelessness or no negligence; we take all the care we can in coal mines, and yet we have a blow up occasionally.

2691. The gas companies have a blow up occasionally now?—Yes.

Re-examined by Mr. *Richards.*

2692. My learned friend does not know much about the ventilation of mines; this explosive mixture, that you talk of, is one of gas to seven or eight of atmospheric air?—Yes; that is the most explosive mixture.

2693. I apprehend that does not differ very materially in specific gravity from the atmospheric air itself?—If you take atmospheric air at one, carburetted hydrogen is about half of that.

2694. Supposing the explosive mixture is very much colder than the external air, by its being colder in the subway; would not that make a difference in the ventilation?—You cannot get a ventilation unless you have either a fan or a furnace to drive it along.

2695. Or unless the air inside the subway is much lighter than that outside?—In winter it would be warmer in the subway, and it would be colder in the summer.

2696. The result is that you think the system of putting gas pipes in subways as they exist now, would be decidedly dangerous?—I should not do it if I had the management of it.

2697. Do you, or do you not, think that it would be dangerous to put gas pipes into subways, as the subways are constructed now?—I do.

2698. Mr. *Jackson.*] If you had an upshaft and a downshaft, do you think that difficulty would be removed?—With care.

2699. Mr. *Paull.*] I should like to ask you a question or two about the learned counsel's barrel of gas; the learned counsel supposed a barrel of gas in this room with the bung out?—Yes.

2700. And he asked you whether the tendency would not be for the gas to escape out of the barrel?—Yes.

2701. Supposing the barrel to be in the centre of the table, and the gas continued escaping, carry your eye to that ventilator there, and that one there, would those two ventilators, or even take two of those large circles which you observe in the wood; would those two ventilators, either the glass or the other, be sufficient to clear this room of the gas that would have escaped out of the learned counsel's barrel, and have mixed with the atmospheric air in this room?—Certainly not by any means.

2702. If it were a 36-gallon cask; I do not know how many square feet of gas that would contain; but supposing a 36-gallon cask containing gas, what would be the effect of the escape of that gas in that case?—If there were a light it would explode.

2703. If a light were introduced and an explosion took place, what would be the result of that?—It would explode, and some of you gentlemen would be burnt.

2704. Would it do more than blow the windows out?—It would do more than blow the windows out; but that is a very small quantity, 36 gallons, by the time it was diffused about.

2705. My question points to this; supposing such an escape from a barrel, small or not into a room like this, would the ventilation afforded by either of those small holes, or even by two of those large holes, be enough to clear the room of gas?—I think not.

2706. Does that in your mind, correspond in some degree to the ventilating shaft in a subway?—Yes.

2707. Did you yourself test with a candle or any other means, the current of air out of the shaft, or along the crown of the arch in the Southwark-street subway?—In the Garrick-street I did; I have not been in the other one.

2708. Did you hold a candle?—I held a candle.

2709. When you held the candle against the crown of the arch, what happened?—The flame stood perpendicular; it did not move one way or the other.

2710. It did not flicker?—No.

2711. And from that you infer that there was no current of air either way?—I tried it then in the centre, and I tried it at the side, and on the floor of the subway, and it did exactly the same thing.

2712. If there was any current of air at all, it would be in the crown of the arch?—If there was any at all it would be near the top.

2713. Did you try the experiment, within half a yard of the shaft, or at the head of the shaft?—I would not like to say that; I was close to one of them when I tried it, and within three feet there was no ventilation at all.

2714. None within three feet of the shaft; the flame did not flicker when you put the candle into the shaft?—It did not make any alteration whatever, because I conclude the heated air upon the surface would not allow it to come down.

2715. Then you did not remark a draught particularly up or down?—No.

2716. The flame burnt evenly?—It was quite stagnant.

2717. Mr. *Jackson.*] Was there any sign of gas?—No.

2718. No blue flame?—No; I looked at the candle.

2719. Mr. *Cornwall Legh.*] You said there was no flickering whatever?—None.

2720. Did you try at the extreme end?—Yes; the very far end; 320 feet.

2721. You are speaking of Garrick-street?—Yes.

2722. Did you try the aperture, just at the end of all; quite at the end of all; the contrary end to the one at which you went in; did you try that with a candle; the hole?—Yes, I tried it.

2723. Was there no effect upon the candle?—None whatever.

2724. It was very different when we were there?—I only speak from the inspection I made yesterday.

2725. You were asked, very decidedly, a question about whether it would be dangerous to have gas pipes put into the subway, and you said, "Yes; it would be"; will you explain why?—Because, in case of any escape of gas, it would make it very dangerous.

2726. Do you mean by "escape of gas," just a partial escape of gas from a slight orifice, or do you mean if the subway became full by some gas pipe breaking?—If a pipe breaks, or if there is any leakage, it would very soon get to such a head as to make it dangerous.

2727. Everybody must be perfectly aware of that; but with the slight leakage that may take place do you consider that that would be very dangerous?—No question of it.

2728. Do you think it impossible for the leakage to escape from the holes?—I think it could not.

2729. The slightest possible leakage would still, in your opinion, be very dangerous?—It would go on accumulating till it became very dangerous.

2730. It will not get out of the holes at all?—No; particularly in the side passages.

2731. Have you any practical experience that that really is so; have you ever known any escape of gas in a small locality that has not got away?—I have not known it in the pipes, but I have known it in pits.

2732. Mr. *Grove.*] Is that gas the same as the gas we are speaking of?—There is a little difference in it, but it is coal gas.

2733. Mr. *Cornwall Legh.*] Then we get to a larger affair altogether; I want to confine you, not to the effect in a pit, that I perfectly understand; but what I want

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I want to understand from you is whether, in your experience, you think that any leakage, any small escape of gas, might be dangerous, because it cannot and will not escape by any means or orifice in the subway?—I consider it to be very dangerous, unless there is a current of air to sweep it away as the leakage takes place.

2734. I ask, have you had any experience in that?—I cannot say that I have had any experience in subways.

2735. What has been your experience of escape of gas; where has it escaped?—I have had experience of the escape of gas in my own house.

2736. Take your own house, what happened there?—The girl left the tap half open, and when I went down in the morning the room was full of gas, and if I had not been at home I have no doubt at all that my house would have been blown up; but I detected it from the smell and got the window open.

2737. If the accumulation of gas had become very much greater it would have had a dangerous effect?—Yes.

2738. But a small escape of gas has not that effect?—But then a small escape of gas going on becomes dangerous.

2739. If it is not allowed to go on accumulating there, it would not have that effect?—If it is detected immediately after the leakage takes place, then it may be put right.

2740. You are aware that your answer was, to the learned counsel, that the putting in of these pipes must necessarily be, under all circumstances, dangerous?—Yes; because the leakage and breakage of pipes must make it dangerous.

2741. Mr. *Jackson.*] Did you find any leakage in the subway when you went down?—I did not.

2742. How long had the pipes been put down?—I do not know; but those side passages are quite as dangerous, and more so than the subways themselves; there is nothing to carry it up to the face.

2743. Mr. *Duff.*] I understand from your evidence two things; that if the temperature is higher outside than it is in the subway, the gas will not escape through the ventilators?—It cannot go without a current to sweep it away.

2744. You do not think the gas will rise through the cold atmosphere?—It will rise up to the top; but, unless it has a very free exit, it will not go out to the surface; it must have some draught to drive it away.

2745. It is contrary to Mr. Bramwell's opinion; I asked him a similar question, whether gas will rise through the colder atmosphere, and he said it would; you hold a different opinion?—I hold a different opinion.

2746. Mr. *Bagwell.*] You said, just now, that when you held the candle up in the subway, the flame did not flicker either way, but burnt straight up; and you conclude from that that there was no ventilation; if you had drawn the curtains in your house at night, in cold weather, and the flame of the candle went straight up, should you infer that there was no ventilation?—I have got a fireplace in the room.

2747. But, supposing your room, in a summer evening, with the window shut with a fireplace in the room, if the flame went straight up, would you consider that there was no ventilation?—No; if there are three or four people in the room, the heat of their bodies would cause a ventilation.

2748. You would conclude, would you not, that you were in a bad way as to ventilation?—I should see that there was not quite enough air.

2749. Mr. *Floyer.*] You did not see the ventilating shaft in Southwark-street?—No.

2750. Mr. *Grove.*] If there were ventilating shafts over the side passages would that assist the draught?—It might to a certain extent, but they would have to be much larger.

2751. Are you aware that there are ventilating shafts in the passages in the Southwark-street subway?—No; I have not seen them.

2752. Mr. *Bagwell.*] Is the firedamp that we hear of in coal mines the same thing as the gas of commerce?—It is not quite the same; there is a little difference in the specific gravity, but not a great deal.

2753. Which is the heaviest?—The gas that is made from the coal.

2754. It is heavier than the firedamp?—Yes.

2755. *Chairman.*] In fact you consider a subway more dangerous than a coal pit?—Unless it is properly ventilated.

2756. But

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2756. But you fancy that all coal pits are well ventilated?—We take all the care we can, but still we have accidents; and the same thing may happen in these subways.

2757. You do not consider that there is the same means of ventilating subways that there is in coal pits?—It depends upon the length of them; here there is only one draught, as it may be termed, in the subway, and in the pits we have a great many galleries.

[The Witness withdrew.

Mr. *Joseph William Bazalgette*, called in, and having been sworn, was Examined by Mr. *Cripps* as follows:

Mr. *J. W. Bazalgette.*

2758. MY friend handed to you a statement of certain information which you were to furnish; have you that statement with you?—Yes; it is here (*producing the same*).

Cross-examined by Mr. *Clerk.*

2759. Will you read the entries you have there?—They are as follows:

"*Information for Parliamentary Committee on Subways (Metropolis) Bill.*

"Length and dimensions of all subways authorised by the several Acts scheduled to the Bill.

"Covent Garden Approach.—Length, 320 ft.; dimensions, 6 ft. 6 in. high by 12 ft. wide.

"Southwark and Westminster Communication.—Length, 320 ft.; dimensions, 6 ft. 6 in. high by 12 ft. wide.

"Victoria Park Approach.—Length, 5,100 ft.; dimensions to be determined by requirements of the several gas and water companies.

"Thames Embankment Act, 1862, and Thames Embankment Approaches Bill, 1867.—Length, 11,000 ft.; dimensions, portion executed, 7 ft. 6 in. high, and 9 ft. wide; remainder to suit requirements.

"*Dimensions to be determined by the requirements of the several Gas and Water Companies.*

"Metropolis Improvement Acts, 1863.—Length, 3,600 ft.

"Thames Embankment Act, 1863 and 1864.—Length, 4,350 ft.

"Whitechapel and Holborn Improvement Act, 1865.—Length, 1,200 ft.

"Chelsea Embankment Bill.—Length, 4,120 ft.

"Park Lane Improvement Bill.—Length, 800 ft.

"*Garrick Street.*

"Number of Houses - - - -	22
" ,, Gas Services - - -	21
" ,, Water Services - -	18."

2760. Are any of those roads made; take the Victoria Park Approaches Act, for instance; are the roads authorised under that Act made?—Yes.

2761. The whole length?—Yes.

2762. You told me that it was 5,100 feet?—Yes; I think that is all made.

2763. The works authorised under the Thames Embankment Act of 1862 are in course of construction?—Yes.

2764. Also those under the Thames Embankment Act of 1863?—Yes.

2765. The Victoria Approach-road is made, but the subway is not made, is it?—They do not propose at present to put any subway in.

2766. Are there already mains of gas and water put into that road?—I cannot tell you that.

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2767. But you take power by this Bill, if a subway is made, to make the companies put their pipes in there?—Yes.

2768. With regard to the Metropolitan Improvement Act of 1863, what are the subways proposed to be made under that?—There are none proposed at present.

2769. How many roads are there. Number 5 is the Metropolitan Improvement Act of 1863; how many streets or subways were you authorised to make under that Act?—The subways are not specified.

2770. Is it a general power?—We have a general power to construct subways in those streets.

2771. What streets?—Under those improvements.

2772. I understand that you have power under the Metropolitan Improvement Act of 1863 to make a subway?—I do not know.

2773. Now this is the Act of 1863. Is the road in the Whitechapel and Holborn Improvement Act made?—No.

2774. No part of it?—No.

2775. Is that the Holborn Viaduct?—No.

2776. It is a road yet to be made?—Yes.

2777. Are you obtaining any powers in the present session for making any new roads?—No; I think not.

2778. There are no new subways being authorised in the present year?—No.

2779. Will you give me that Act of 1863, that I may see what roads are included in it?—It has been sent for; it is not here at present.

2780. Now, in any one of these cases, are there any lateral subways at right angles or extending laterally to any of those authorised, or are they all central subways?—There are no lateral subways in those we have constructed or are constructing.

2781. There are a certain number scheduled here under this Act; will any of them be lateral subways?—I cannot answer you.

2782. You do not know?—No.

2783. They may, or they may not be?—They may, or they may not be.

2784. Have you got the Metropolitan Improvement Act of 1863 now?—Yes; here it is; it is an Act for making a new street from Blackfriars to the Mansion House, in connection with the Thames Embankment.

2785. Mr. *Jackson.*] While the learned counsel are looking at that Act, I will ask you, supposing that in the line of the subways which you ought to construct, there is a large cross street to which you would want to make an additional subway, would you turn at right angles, or with a sweep or bend?—With a bend, of course.

2786. So that there would be no difficulty in the gas and water flowing on in the event of your making a bend?—No.

2787. You have not done that yet in any of the subways that you have made?—No.

2788. Mr. *Clerk.*] You told me that the Victoria Park Approach Road was made; if you put a subway there, you would have to open the road from end to end to build your subway?—Yes.

2789. Is the road authorised under the Metropolitan Improvement Act of 1863 being constructed?—Not yet; the property is being purchased.

2790. Is the Victoria Park Road the only one which is yet complete?—Yes.

2791. You were to give me also a drawing or sketch, showing how in a subway you would accommodate a nest of large mains, have you got one?—I have; in presenting this drawing, I wish to observe, that the case put to me was an extremely exaggerated case, such a case as has not yet occurred in London; and this is the mode in which I should propose to deal with it (*producing a plan*); I was called upon to put in four 36-inch mains, and four 30-inch mains, besides mains for the district and supply pipes.

2792. You call that an exaggerated statement?—A very exaggerated statement.

2793. Are you aware that the supply of three-fourths, or at least two-thirds of London is taken from one locality in the Thames, and that there are a great number of large mains do run along the same roads?—I am told by those competent to give me the information that the pipes in this subway would contain sufficient gas for the whole of the north of London.

2794. *Chairman.*]

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2794. *Chairman.*] It is an important question as to whether a sufficient number of pipes can be supported in the subway; this plan is produced by you to show how it could be done if it were required?—Yes; in that subway there are 16 pipes of larger dimensions than are to be found in any part of the metropolis at the present time; I find in the evidence given before the Committee a number of cases given, and the largest number of pipes in any one place in those instances is 16, and they are very small pipes indeed; all small pipes, as compared with the pipes here. I say, first, that no such case can be found to exist at the present time, and I say that broadly; and further, I say that if there were no subway, then it would not be possible to put all those pipes in that street without putting one underneath the other: therefore I contend that better accommodation is given by the subway than is afforded by the pipes being laid in the soil of the street.

2795. But that is argument; I wish you to come to the facts, and tell us how you would deal with it. Suppose the case I have put, of three or four large mains for water and gas, what would be your dimensions for the subway; how would you deal with it?—There is room here for a man to go round all these joints (*explaining on the plan*).

2796. *Chairman.*] You mean that you would have side ways?—Of course; if you had to begin afresh; if there was one already made, I should have to put in side subways afterwards.

2797. And that would be possible?—Quite possible; but in this case there is an abundance of room between each of them to put in a number of pipes yet.

2798. Therefore, the safest plan would be to begin with the centre?—Yes; and to spring from that again, and throw other arches over. You see those iron chairs are put in at distances to carry the pipes.

2799. Is there a ventilator here?—Yes; and in the crown of each of those arches there would be no side subways required in that case, because these would be close to the gratings, and these are the service pipes running on; there are five feet between each of those for getting up and down the centre.

2800. Mr. *Clerk.*] I have not had an opportunity of seeing that yet; but allow me to correct what you stated to the Committee. I think you said you had looked at the evidence of 1864, and had ascertained that in no case were there more than 16 pipes in any street, and that those were of small dimensions?—I did.

2801. The evidence given by Mr. James Simpson in that year was this. No. 3025 Question is put to him with reference to a sketch, apparently that he had made, and it is as follows: "You have not allowed anything for working space there in your sketch?"—*A.* "No; I wanted to see what would fill the subway up, and that does not appear to me to be a very extraordinary state of things. In a few years' time they would find it filled up, because we can hardly set a limit to the increase, more especially with reference to the transferring of gas and water pipes from one district to another. You may say we may limit the number, but you cannot limit them. Take our Chelsea district; we have five gas companies all coming through that district with leading mains. How are they to get to the City, and over the denser part of the metropolis about Charing Cross?—Why, of course, by going through Charing Cross; they can get no other way. I should like to know how they would make a subway there; there are more than 30 lines of pipes at Charing Cross?"—Charing Cross is a wide space, with four or five streets coming into it; it is not a simple street.

2802. Several subways would be required there?—Yes; there would be three or four subways in that expanse.

2803. Then, in this case, the subway would extend the whole width of the street?—It would extend from vault to vault.

2804. Have you at all estimated the cost of making such a subway as that?—No.

2805. What is the length of that?—The whole width of the street is 60 feet, that is about 38 feet.

2806. Your present subways are 12?—Yes.

2807. Then you would have service mains in the side galleries, and the supply pipes applying to other districts; the trunk mains would be in the centre?—Yes.

2808. Now, supposing you had to communicate with any lateral street from one of those trunk mains, how would you get it across to the side street?—This is the way in which I should do it, if I had to communicate between any of those pipes (*producing a plan*). I have taken the worst cases there in the centre, and in every instance there is plenty of room for a man to get between them.

2809. Mr. *Jackson.*] Have you ever thought of carrying it up to the crown of the arch?—Yes; that is another way; it is perfectly competent to carry it beneath the sewer if there were not room above.

2810. In this case the gas would require a syphon?—Yes.

2811. *Chairman.*] It is important that you should show that it can be accommodated quite independently of what the expense may be?—It can easily be done.

2812. Mr. *Clerk.*] This is the floor of the subway?—Yes.

2813. This would come down then through the sewers?—No; it would not.

2814. This is the sewer from the house?—Yes.

2815. You bring it below the floor of the subway?—Yes.

2816. Then it rises again to the other streets?—Yes; free of the subway to go which way it likes.

2817. Have you estimated the cost of such a subway?—No; but it is much cheaper compared with the amount of accommodation than the other subways that we have built, because there are no side arches requisite.

2818. It would be as great a work as the Metropolitan Railway; would you not have to purchase the adjoining houses and shore them up?—No; we should not have to purchase a single house.

2819. You would have to stop the traffic during the whole time you were making it?—Yes; if we were making a new street.

2820. In making the Metropolitan District Railway, had they not to purchase a great deal of adjoining property?—Yes.

> Mr. *Jackson.*] We are not sitting here to judge of the cost of these subways; that is a question for the ratepayers. As I understand the object of the arbitration it will be this, that if there be no saving the arbitrator will say that you will have to pay nothing.
>
> Mr. *Clerk.*] This is a Bill to force gas and water companies into any subway that may hereafter be made, and therefore I want to show in what manner the companies will be affected by the expense to which they will be put.
>
> The *Witness.*] I cannot state the actual cost, but allow me to put it in this way. It would be much cheaper for the gas and water companies to pay a fair contribution towards any subway where there are many pipes, as there, than it would be in an ordinary case, where you have a few pipes and one subway. Besides, that is so extreme a case that I do not know where it is going to occur, and if it does occur there cannot be much of it.
>
> *Chairman.*] This evidence is put in in consequence of the observations made by Counsel that it was almost impossible to arrange the pipes.
>
> The *Witness.*] It is to show that it is possible.

2821. Mr. *Clerk.*] Then, in this case, you would require to have separate entrances to each of these galleries?—I should provide them; it is not necessary, because a man can get from one gallery to another.

2822. Supposing the mains were laid as here in this tracing, and you required to get a large main in here, to the central gallery, you could hardly get it from here?—I have provided for two or three of these contingencies, and I will show you how I propose to do it. I have a sketch here (*producing the same*), to show how a difficulty that was suggested here could be overcome. There is an opening in the crown of the subway here (*explaining the same*), the pipes are brought in here; it is raised here in that position; it is lowered to that point, taken on the end of the truck here, let go here, and then let down quietly on to that truck. This is one of those large openings of 3 feet 6 inches diameter.

2823. Mr. *Jackson.*] There is quite room enough to let the pipe go down aslant?—Yes.

2824. *Chairman.*] What is the usual length of one of those pipes?—Twelve feet.

2825. I think it was stated here, that when you got it on to the truck, you would

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would have great difficulty in raising it on to these little stands, or whatever you call them?—I do not know of any, I am sure.

2826. What is the weight of one of these?—About a couple of tons.

2827. Of what size are they?—Thirty-six inches.

2828. Mr. *Clerk.*] Although, of course, the question of cost in the construction of a subway would be a question for the ratepayers, the cost of putting in these sorts of special castings to make these lateral communications would be thrown upon the company, would it not?—I see no castings there that you have not got plenty of.

2829. I do not know the scale of this; but you bring it down a considerable distance to go up again to the surface to the next street?—That depends entirely upon what depth you want it in the next street.

2830. You bring it down here some distance below the floor of the subway?—Yes.

2831. If there is no subway in the adjoining street, you would bring it up to the ordinary level of the soil; three or four feet below the level of the street?—Yes; I may as well show you another case, my Lord, which I thought the learned counsel would put to me; that is a cross street, with large pipes crossing the subway. That I should meet in this way. This is the same subway (*producing another sketch*); but I am assuming the construction of a subway with a very large pipe across it. I should put in an iron trough in that way, and any number of pipes could then be carried across.

2832. Mr. *Jackson.*] You could pass it over the subway, could you not?—Yes; that is taking the two cases, passing over and passing under.

2833. Mr. *Paull.*] The top of the subway would be flat, and the arches would be shifted?—There would be a trough, in the same manner as they did it in the Metropolitan Railway. I am assuming a large pipe in the soil.

2834. Mr. *Jackson.*] It would be done in the same manner as they carried over the Fleet Ditch?—Yes.

2835. Mr. *Clerk.*] Will you explain that to me?—Yes. (*The Witness explained the plan to the learned Counsel.*)

2836. Do you mean that there would be a trough at the top of the subway?—Yes.

2837. Then you have to take off so much from the height of your subway at that place?—At that particular point.

2838. And to make it a flat arch?—We should make it a girder.

2839. If any pipe were carried across the top of the subway in that way, you might require to open the street above the subway?—We should do that in the formation of it. If a company came after the subway was formed, they would open the street to take in their pipe.

2840. Then do I understand that there would be always room between the top of the subway and the surface of the road to put in a pipe?—Yes.

2841. That would always be so?—Yes; I have given you that as an extreme case, where the top of the subway comes as close to the surface as it can.

2842. There is no connection at all, that pipe going across there, with the mains in the subway?—I am assuming in that case that it would have none, that you wished to do it without having any connection.

2843. It would be connected with some other company, or supplied from some other source?—Yes.

2844. How much would be the distance between the top of the trough and the pipe in the roadway?—It is 2 feet: we can give you 2 feet 6 inches if you want it. Will you allow me to say that I wish to put in two returns to the Committee; one shows the way in which the gas and water pipes at present are cut into, and interfere with the sewers.

2845. Mr. *Clerk.*] I thought your case was concluded?—I am putting in a return to show the Committee that gas and water pipes, laid as they are at present, are continually cutting into our sewers, passing through them, and giving instances where that has happened, and sketches showing the manner in which they have cut through them.

2846. What do you mean by cutting into your sewers?—The gas pipes coming along cut into the sewers, and block them up and interfere with them.

2847. Not without your concurrence?—Unfortunately they do; and I am giving intances in which they have done so, showing the great inconvenience resulting from the laying of gas and water pipes under the present system. They do not intend to do it, because they give us notice where they are aware of it; but where the soil is full of sewers and drains it often happens that they do it (*the Witness then handed in the Returns*—See *Appendices A* and *B*).

2848. The opening of the road is always under the superintendence of the vestry?—Yes; but the vestry are not always there to attend to it. There are cases that have come to our knowledge; other cases have occurred that have not come to our knowledge.

2849. You mean to say that it is the neglect of the vestry?—Yes. Then a great many questions have been asked here about explosions, and as to whether instances of any could be given. Now here I have given you 30 instances of explosions that have occurred to our own people, where the gas mains have leaked into the sewers and injured our people. There are these remarks made upon them at the time, so that they can be referred to and testified as facts that have taken place. You asked several of the witnesses if they could give you instances of explosions that have taken place under present arrangements. You asked Mr. Hemans that question for me.

2850. But that could not occur to a sewer in a subway like this?—No.

2851. You mean sewers or drains that are high up in the street?—I say that when the pipes are laid in the soil adjacent to sewers, they leak into the sewers and cause explosions.

2852. Then the sewer must be in a wrong position if it is near the surface of the street?—No; the sewer is not near the surface of the street.

2853. The gas and water pipes are not lower than four feet from the surface? —I can show you each instance that has occurred. They are in these statements. I simply give you the facts, and they are attested facts which cannot be denied.

2854. The same thing would happen supposing you had these subways?—No; it would not.

2855. They would continue in the existing streets?—Yes.

2856. Where there are no subways those sewers would remain as they are?—Yes.

2857. Where there are no subways the water and gas mains would continue as they are?—Yes.

2858. Therefore the state of things you are complaining of would continue as they are?—Until we get subways.

2859. Then you would alter your sewer?—No.

2860. If you made a subway you would have to remove your sewer?—Not necessarily.

2861. Your sewer, that you complain of being interfered with, is so near the surface that in laying the gas and water pipes they sometimes got into the sewer?—It does not follow that it is so near the surface of the street.

2862. You talked of breaking into the sewer?—No; I talked of leaking into the sewer. I gave you two sets of instances; the first relating to gas and water companies breaking into sewers, the second relating to leakages.

2863. I was talking of breaking into the subways; if you make a subway for the purpose of remedying that evil, I say you must remove your sewer?—Yes.

2864. The sewer then would be below the subway?—Yes.

2865. You say that in certain cases the gas leaks into the sewers?—Yes.

2866. That is in cases where the sewer is nearly adjoining, and in the neighbourhood of a gas pipe, and where you have no subway?—It must be somewhere in the neighbourhood. It does not follow that it must be exactly adjoining.

2867. Until you have a subway the sewer must be in the same position?—Yes.

2868. And the gas and water mains also?—No doubt; but when we have subways, and the pipes are laid in those subways, neither of these classes of accident can occur.

Re-examined by Mr. *Cripps*.

2869. My friend has put several questions upon the subject of explosions to previous witnesses that we have called, and amongst others to Mr. Hemans, to whose evidence you referred just now. Are these the words you were alluding to

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to then; Mr. Hamons is asked:—" 892. If gas is laid down in the earth as it is now, no escape can take place, and therefore no explosion would take place?—That is directly contrary to the evidence of M. Belgrand, who gave us 15 or 16 explosions, resulting from the present system. The gas does escape. The joints draw, and the gas escaping finds its way through the earth to the nearest sewer, and then it explodes. 893. I am taking London. We have had gas in London now for half a century; you never heard of an explosion of a severe character arising from the cause you have mentioned?—Yes; the explosions have all occurred from that cause; none of them had occurred in subways."—You remember that evidence, Mr. Bazalgette?—Yes.

2870. The object of the return you have produced is to show from actual facts that the gas has found its way into the sewers?—Yes; I may also mention another instance where in constructing sewers the ground, near where there have been defective gas pipes, has been shaken, and the gas pipes broken. In Church-street, Shoreditch, the ground of the footpath near to an open trench gave way, a 6-inch pipe was broken, and blew down a house, killed nine people, and blew the windows out of four or five adjoining houses. Had the pipes been in a subway no such accident would have occurred.

2871. Of course the leakages into the sewers could not happen if there were subways?—No.

2872. Now, with reference to the plans you have put in, the only necessary limit to the breadth of your subway would be the limit of the breadth of the street?—That is all; it is quite clear that you can accommodate more gas and water pipes in subways than you can accommodate without. It is clear that you can put one over the other, and get all round them without the least difficulty; whereas if you put one under the other in the soil, you undermine it and injure it, beyond which it is difficult work and very expensive.

2873. In the street, as laid at present, you cannot put one pipe over another?—You can do it, but you cannot have it with safety.

2874. In subways you can have two tiers of pipes?—Yes.

2875. Therefore wherever there is room, under the existing system, there would be more room under the subway system?—Yes.

2876. In that case you would have your side subways less in length?—Yes; and therefore considering the amount of pipes accommodated, the cost of the structure would be cheaper. If you have to divide the cost of that subway among four gas companies, it would come to less than if one company only was going through a smaller subway.

2877. It is a mere repetition of that which you find in building, that you get your four walls cheaper the larger the space there is between them?—Yes.

2878. Now, with reference to the bent pipes; pipes of that kind are sold every day, are they not?—Yes. Those are very rare and exceptional cases that you find in that sketch.

2879. But if you made a contract for a great number of pipes, you could get them made easily enough?—The gas and water companies keep all those curves and bends in store at present.

2880. Are those bends anything at all more than putting vertically, wherever there is a turn of the street, that which is at present put horizontally?—No.

2881. They are in constant use where streets are turned?—Yes.

2882. All you have to do is to take one of the same kind, and instead of laying it horizontally to put it vertically?—Yes.

2883. Mr. *Jackson.*] Evidence has been given by Mr. Forster that the subways for service pipes have no ventilation at all; have you provided for that?—I heard Mr. Forster's evidence, and it seemed to me that he argued from the shaft of a mine; that he compared the passages of a mine with those of a subway. It must be borne in mind that the air which comes down the downcast shaft passes through many miles before it reaches the upcast shaft, and therefore there must be some collection.

2884. I am very well aware of how coal shafts are ventilated, and of how necessary it is to take the circulation round the stalls where the men are working; have you made any provision for taking the ventilation round those branches of the subway in which the service pipes are placed, because otherwise there might be what is called a pocket of gas?—There can be no such thing in subways.

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2885. Why not?—It is an even surface, with openings close to each other.

2886. Supposing there was a vent in one of the surface pipes, which are more apt to crack and give way than the mains; supposing a crack to take place, and there was an emission of gas; it might not appear in the subway, but it would be held in suspension in the side subways where the services pass through?—Then it would rise. I should tell you first that in the side subways we provide a pipe that comes up to the surface and gives a current of air.

2887. That is enough; we have not heard that before in evidence, and it appeared to me to be necessary that some precaution of that kind should be taken so as to secure a current of air?—Were we to have no such provision the gas escaping would rise to the top of that side passage; it would begin to accumulate there until it got sufficiently dense, but it would not then descend and keep still in the side passage and form a natural wall of its own, but it would still desire to rise, and the moment it got to the side passage it would rise up to the crown of the arch of the subway, and travel along the subway and go out at the grating.

2888. It was supposed that it would lodge in the side subways?—There is no corner or pocket in those side passages; there is nothing to hold it.

2889. If you say you can put a pipe there so as to carry a current of air in, that would be sufficient; but in my opinion it would be absolutely necessary that that should be done. I do not mean to put my experience against yours, but that is my opinion.

2890. Mr. *Duff.*] You have not got that pipe in Garrick-street yet?—No.

2891. Mr. *Grove.*] It is in Southwark-street?—Yes; the ventilators are placed apart.

2892. Mr. *Bagwell.*] Does that ventilate the side passages?—Yes; we have not put it to all of them; it did not occur to us that it was necessary. When the objection was taken it was simply put it in to show how easily it could be done.

2893. One of those might be put in each subway?—Yes.

2894. Mr. *Jackson.*] I think it is absolutely necessary that it should be put there?—It would clearly give air to the bottom of the subway, and the gas would pass through the top.

> A discussion arose as to whether consumers would not have to pay an increased price for gas in the event of the companies having to pay the Metropolitan Board of Works for the use of the subways, but it being considered premature, and that the question would be more appropriately dealt with when the clauses came under consideration, if the Committee passed the preamble, the subject dropped.

2895. Mr. *Clerk.*] I understood you to say, Mr. Bazalgette, in answer to a question from an Honourable Member, that in the Southwark-street subways there were openings from lateral passages into the streets, and that those were visible?—Yes, I did; I said that was the case in some of them.

2896. Were not those openings that were seen the openings at the end where the service pipes are to go through, and where the walls are left unfinished, in order to communicate with the houses when they are built?—No; at least I will not say that there are not some such.

2897. Will you be good enough to point out where the opening is in the Southwark-street subway?—It is here (*pointing to it on the plan*).

2898. That would not be visible passing along the subway?—

Mr. *Duff.*] Yes; I saw it.

2899. Mr. *Clerk.*] How many are there in Southwark-street subway?—I cannot tell you. We have put it in to show that they can be put there.

2900. There are none in Garrick-street, are there?—No; but they can easily be put in.

2901. *Chairman.*] The last explosion recorded in your returns is that which occurred in 1861?—Yes; that is the last I have recorded there.

2902. There have been several since, I suppose?—Yes, several.

2903. Mr. *Paull.*] I wish to ask you about the ventilation of these subways. When in the subway this morning I tried the effect of holding a candle up to the crown of the arch in different places, along the whole interval between the shafts, and, as a rule, I found there was no current of air whatever; that the candle did not flicker; how do you account for that?—I do not know that I can account for it. You will find the conditions very variable at different times; but I hold that it is not necessary to have a current of air to get ventilation in the subways. There being such a number of openings, if there be an escape the gas will rise to the surface and get to the outlet. In a mine your upcast shaft is a mile, or sometimes several miles distant from the downcast shaft, and it takes a long period, therefore, before the gas can reach it; and in that case a large portion of the gas would be detained by pockets or inequalities with which it meets in its passage; but that is not the case in a subway.

2904. But the idea of escaping by a shaft presumes a current of air, does it not?—No; I think not.

2905. It presumes a current of gas?—No; it is simply this, the gas being lighter than the atmospheric air, will rise above it.

2906. Assume that it has risen and reached the crown of the arch; if it is to reach the shaft, you must presume a current of gas or a current of air?—It must either accumulate there and form a large mass and so fill the sewer, or it must still have that tendency to rise and endeavour to get along the crown of the arch, and so come to the opening through which it will rise, and passing away make room for the rest to rise and so continually escape.

2907. Then its own pressure will absolutely establish a current?—Yes.

2908. From my experience of this morning, I found that the pressure of the atmospheric air, which has also a tendency to rise, was not sufficiently great to establish a current, because I did not find the candle flicker along any portion of the whole crown of the arch?—Well, that may be improved, and would no doubt quicken the escape of the gas; but I think with the number of openings we have, it is not necessary. All you require is a sufficient number of openings. If we had one long opening all along the top of the subway, we should not require a current at all; the gas would rise to the top and pass away.

2909. *Chairman.*] It has been publicly stated, and therefore I should like to know whether it is a fact, that in order to make things pleasant, the subway was opened at six o'clock this morning?—Not that I am aware of. In point of fact, I may say it was not, because I have been in that subway myself frequently when the opening has been opened to let me down. In the Southwark-street subway they have been making experiments, and I dare say the men were there early this morning.

2910. No; this was said with reference to Garrick-street?—The men may have been at work to expose the pipes to the view of the Committee, but I am quite sure it was not opened with the object you mention.

[Adjourned to Tuesday next at Twelve o'clock.

Tuesday, 2nd July 1867.

MEMBERS PRESENT:

Mr. Bagwell.
Mr. Duff.
Mr. Floyer.
Viscount Galway.
Mr. Grove.
Mr. Jackson.
Mr. Cornwall Legh.
Mr. Paull.
Mr. Tite.

WILLIAM TITE, Esq., IN THE CHAIR.

Mr. *Charles Greaves*, called; Examined by Mr. *Clerk*.

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2911. YOU are the Engineer to the East London Waterworks Company?—I am.

2912. Your company, I believe, supplies about one-fifth of the whole metropolis and the suburbs with water?—The district which the East London Waterworks Company supply is about one-fifth of the metropolis.

2913. You have been their engineer now since 1852, I believe?—Yes, since 1852.

2914. Now, with regard to the length of your mains in London, what is the length of the pipes and mains of your company in London?—The total length of the pipes, last Christmas, was 475 miles.

2915. *Chairman.*] How far westwards do you come?—Not quite up to Aldgate, a portion of Bishopsgate, outside Houndsditch, and outside the Minories.

2916. Mr. *Clerk.*] That is your district of supply?—Those are the limits of the district of supply towards the City.

2917. *Chairman.*] And then the New River Company take it up?—And then the New River Company take it up.

2918. Mr. *Clerk.*] You will have certain increased powers hereafter to bring water to your district, which I will call your attention to afterwards. In the whole quantity of 475 miles, there would be how many miles of six inches, and upwards, always charged?—One hundred and forty-seven miles of pipes always charged, which we call mains.

2919. Then the rest will be the smaller pipes?—Yes; in addition to that there are about 100 miles constantly charged under that portion of the distributing system which has the privilege of a constant supply.

2920. I believe the length of streets supplied by you we may take at about 300 miles?—That is an estimate; I consider it to be about 300 miles.

2921. Do the streets supplied by your company, in which there are sewers, extend to about 50 or 60 miles?—About that, or probably somewhat in excess of that now, as the main drainage has made considerable progress.

2922. To come to this question of the subways; I believe that in 1864 you considered this question of sending gas and water mains into the subways, and gave evidence upon it before Parliament?—I did; I was examined before the Committee.

2923. And I believe that you have carefully considered that same matter since?—I have; I have had that subject under my consideration since, and for more reasons than one, for the Metropolitan Board have since then acquired authority to make one street in which they obtained power to put a subway, but without compulsory powers over the companies.

2924. *Chairman.*] Which is that?—The Whitechapel improvement.

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2925. Mr. *Clerk.*] In the schedule to the present Bill there are two streets, are there not, in which your company would be interested?—There are two streets scheduled in the Bill within the East London District Waterworks supply.

2926. The Victoria approach and the Whitechapel and Holborn Improvement?—The Victoria Approach Road, which is now locally better known as the Burdett-road, which is executed completely, and also the Whitechapel Improvement, which is not yet begun.

2927. With regard to the Victoria Park approach, that has been completed you say by the Metropolitan Board?—As a road it is completed.

2928. *Chairman.*] Where is that from?—It lies between the Victoria Park and Poplar, which may be considered southwards from Victoria Park.

2929. Mr. *Clerk.*] What is the length of that road, as constructed under that Act?—I think Mr. Bazalgette gave the length in his last day's examination at 5,100 feet. I do not know exactly the length.

2930. *Chairman.*] One thousand seven hundred yards; nearly a mile?—Yes.

2931. Mr. *Clerk.*] No subway has been made, we hear, in that road?—No subway at all has been made in that road.

2932. Is it a place of great traffic?—It is a very useful road. It is on the course where a road was very much wanted; but it is not a line of great traffic, nor do I think that it is ever going to be one of great traffic.

2933. At the present time there are one main and two service pipes in that road?—We have at present one main in the roadway, and we have a service pipe on each side; the service being laid in the footway.

2934. To supply houses as they are built in that road, on either side?—Yes.

2935. When was the water main laid?—Four or five years ago; it was not all laid at once.

2936. Since the water main was laid in that road, has the road ever been opened for the purpose of your main?—One small opening for a leak, I remember to have been made; that is all we have any record of.

2937. *Chairman.*] Was that the main or the side pipe?—The main pipe.

2938. What is the diameter of the main?—It is only a 6-inch main in the roadway.

2939. What is it under the footpath?—A 4-inch pipe each side; the pipes in the footpath are merely for the local supply of the houses facing the road.

2940. Mr. *Clerk.*] And having those small pipes in that position, entails only a short length of communication pipe to the houses?—Precisely so; that is the object we had in view; it was for the benefit of the public, and it saves breaking up the roads. Where a road is of the breadth of the Burdett-road, we find it advisable to lay a service pipe on each side of the road, rather than one in the middle, which entails lead pipes being brought from both ranges of houses to it.

2941. Is the present mode of attaching communication pipes to the mains by means of a screw?—All connections for the supply of water now in my company I have made by a screw attachment.

2942. When that is done, does it rarely happen that there is any disturbance of the streets takes place after the communication pipe is once laid?—Very rarely indeed; we have now adopted an improved way of making these attachments, and the casualties arising by them are very few.

2943. As new houses are built, you have, I suppose, to put in new communications?—We have.

2944. And for that purpose, when a house is built, and a communication made, you have the opening at the side of the pavement?—An opening made in the footway, but the footways in this instance are not paved.

2945. Have those openings had to be re-opened since they were laid some five or six years ago?—I am not aware of any; I will not say that none have been opened, because it is possible that there may have been some, but none to take any notice of at any rate.

2946. As to the interference with the use of the footway, what would be the extent of opening required to lay a communication or service pipe from the small main at the side to the houses?—The smallest possible channel, not more than

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than a foot wide, with an opening a little larger immediately over the pipe where the attachment is to be put in.

2947. What length of time would be taken in the opening, screwing in the communication, and filling it up again?—Probably the whole operation would be done in a couple of hours; allow me to mention that the Burdett-road is an outlying road, which is far from the focus of the metropolis; it is even beyond the four mile circle.

2948. But it is within the district of the Metropolitan Board?—It is within the metropolis, certainly.

2949. You mean that it is not likely to be a road constituting a very great focus of traffic?—It is, I believe, the furthest removed from the City or the centre of London, of all the roads contained in the schedule.

2950. With regard to the Whitechapel-road, which is also scheduled, that has not been commenced yet, I understand?—I do not know what has been done; the road itself has not been commenced, but I am not aware whether any property has yet been purchased for it.

2951. What will be the length of that road?—It is less than a quarter of a mile; Mr. Bazalgette has stated it to be less than a quarter of a mile.

2952. The road, if made, would be in a very central position, would it not?—It would be a leading thoroughfare, and a very great improvement.

2953. Will there be a large number of gas and water pipes carried down that road?—I should not think that a large number would be required, but it would be a short cut; it is a line on which pipes may possibly be laid, more especially should any of those large works which are proposed even this Session by the gas companies for new stations at the east end of London be carried out; it is not at all an unlikely road to receive the carrier mains which they may lay down.

2954. What sized mains are they contemplating to have?—They talk of four feet, and I suppose that is a likely size.

2955. *Chairman.*] Do you think that they are more likely to go down that road than down the Whitechapel-road?—They propose coming up the Commercial-road, and following the upper part of the Whitechapel-road into London; therefore I take it for granted they will take that road.

2956. That street very soon ends in a parcel of embarrassments in the shape of small streets leading into Whitechapel, does it not?—It comes out at the top of Leman-street; it would be decidedly a preferable road to take to going up to the top of Church-street, Whitechapel.

2957. Mr. *Clerk.*] Supposing a subway for a quarter of a mile was made in that street, would that entail a very great inconvenience from the difference of level there would be in the adjoining streets if you laid your pipes there?—There would be the inconvenience which attaches to small lines of subway being made, that of dipping down and rising up again, which would form part of the work.

2958. Now, upon the general question of the use of subways by gas and water pipes; I believe you still retain the strong objection you had in 1864?—I do not altogether deny that there are certain advantages connected with the construction of subways, advantages to the public.

2959. Of course there are advantages to the public in the saving of the breaking up of the roads, that is obvious; but what other advantage to the public is there besides saving the opening of streets?—I am not aware that the public will gain any benefit except as to the opening of the streets in the first place and the non-interruption of the traffic; in the second place they will be relieved from those costs which attach to houses where a charge has to be made upon them for laying on gas and water, part of which might perhaps be avoided if the work is done in a subway.

2960. *Per contra* would not they have to consider what they would have to pay for the cost of making the channel which is to carry the gas and water?—The cost of that they would have to bear through the rates.

2961. Whether gas pipes are laid in or out of subways, from your experience, have you any doubt that they will be always more or less liable to leakage?—I consider that gas pipes will always be liable to leakage.

2962. Will it arise as well from the structure of the pipes as from defective joints and neglect of the workmen?—I consider it to arise mainly from the defective joints and the neglect of the workmen, but occasionally from the carelessness of other parties, not those in charge of the pipes.

2963. *Chairman.*] What does that mean?—The carelessness of other parties?

2964. Yes?—The carelessness of the workmen of other companies.

2965. Mr. *Clerk.*] Though there might possibly be a less tendency to leakage in the subway than when the pipe was laid in the ground, in your opinion would there still be great risk of leakage from accidents, and from negligence of the workmen in the subways?—I consider that there would be a risk of leakage from accidents, and omissions and neglect from gas pipes lying in a subway.

2966. I do not know whether you have considered from your examination of those subways whether there would be a tendency for this gas to collect in different parts of the subways?—It appears to me to be inevitable that collections of gas must take place.

2967. Mr. *Cripps.*] Are you a gas engineer?—No.

2968. *Chairman.*] Are you a chemist?—No.

2969. Mr. *Clerk.*] But you have had experience during the many years that you have had charge of the East London Waterworks, of the leakage of gas, and of gas collecting in places where there is a possibility of its collecting?—It is a matter of familiar knowledge that cannot be denied to anyone that gas is liable to collect.

2970. I will not ask you anything about the explosive character of the mixture; but supposing that an explosion did take place, have you any doubt that it would be attended with very serious consequences to the water pipes?—That would be entirely a question of degree; the whole matter, in fact, is so entirely a question of degree, that it is a very difficult thing for a person to give conclusive evidence as to the general effect.

2971. With respect to water pipes, if laid in subways do you consider that they would be less liable to accident from violence than they are at the present time, being laid in the ground?—On their own account you mean?

2972. Yes?—Certainly; they would be no less liable on their own account to accidents than where they are at present.

2973. There is always, is there not, in water pipes a liability to burst?—There is a liability to crack, and a liability of the joints to become loosened and blow out, and large issues of water take place; an actual rupture or bursting of a pipe is a thing which very seldom occurs; it only happens occasionally in laying new mains; it very seldom happens with pipes that have been in the ground any time.

2974. Are variations of temperature one cause of leaking or breaking of the joints of pipes?—Certainly; variations of the temperature in any seasons that are below the average degree of cold, invariably lead to a great number of breakings of pipes, not always mains, but of smaller pipes.

2975. Do you think that the water pipes and mains would be less liable to fracture from that cause in a subway than when buried in the ground?—I cannot see that they would be less liable if laid in a subway; pipes are generally laid in the ground with about two feet of soil above them, and I cannot see but what they would be more likely to be affected by variations of temperature in a subway than when in the solid ground.

2976. Supposing a water pipe to burst in a subway, would it be attended with much more mischievous results than if it were to break in the ground?—I think so.

2977. In the first place, if a large main were to break in a subway, would it have a very injurious effect upon the gas pipes?—It would disarrange the apparatus and all the affairs that were below, more than it does in the street; the flooding might not be any very enormous quantity of water, but pipes may be put under water, so that the means of opening and shutting them may not be visible unless there was some means got of ridding the place of the water.

2978. If a pipe were to burst, supposing the pipe were a large one, and there was a large quantity of water issuing out of it, you would know at the river head, at the pumping engine, that there was a loss of pressure somewhere?—If the leak were very large; but the flow of water from such works as the Metropolitan Works in the daytime is so large that a very considerable leak might take place two or three miles off from the town without it being so perceptible at the works as to lead to any knowledge of it in that way.

2979. Even supposing, after a time, that you got any information at the works that

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that there was a leak somewhere, would that at all guide you as to where the leak has taken place?—Not the least in the world.

2980. There would be a loss of pressure somewhere in your system, and that is all you could learn, even if you learnt that?—Yes.

2981. At present, if a pipe breaks in the soil, it shows itself very soon by breaking out on the surface of the street, does not it?—Immediately; even a very small leak invariably comes to the surface, unless by some singular casualty there should be a sewer close by, by which the water can pass away.

2982. Of course you are practically acquainted with the mode of laying pipes, and the doing the repairs of the pipes; now, supposing that pipes had to be laid or repaired in a subway, would artificial light be necessary during a considerable portion of the year?—I should consider that artificial light would be necessary at all times.

2983. You were in the subway the other day when you saw a pretty experiment, on a bright day, with reflectors?—It was a clear day, and the reflectors were down, and certainly they were very efficient and added very much to the general light of the place; but Mr. Upward was there and tapped a hole in a main, and screwed a pipe in the main, the men who were there to do that for him had candles, nevertheless.

2984. I think that was done within about a yard of the ventilating hole, was not it?—It was.

2985. And candles were lighted and used during that job?—They were.

2986. But still, during the greater part of the year, during the whole day in the months of November and December, and in the winter months, artificial light would be necessary to be used?—I think so.

2987. Of course either the molton lead must be melted in the subway, or must be brought down through the ventilators, or let down somehow or other in the subway?—It will have to be melted in the subway, or brought in in a molten state; if the entrances into the subway were frequent, the lead might be brought down in a molten state.

2988. Does that lead you to believe in the first place on the question of danger, that the use of such lights in the subway would be attended with danger, if there was any accumulation of gas there?—It would be attended with that degree of danger that it would necessitate a special precaution; I do not say that the danger is so great but what it may be overcome or surmounted, but it will necessitate special precaution, and some continuous charge in somebody's hands, to see that the operations are all carried out in a sensible and efficient manner.

2989. In your opinion on the question of expense, would there be greater expense in doing the repairs in a subway than in the open road?—That is rather a question of a wide range, and I do not precisely know how to answer it; on the whole, I think the expense of repairs would be greater in a subway than in the open ground.

2990. Of course time is one element in the cost; will the workmen be working at greater inconvenience to themselves in a subway than in the open air?—That is also rather difficult to answer, but they will want a great deal more looking after in a subway than if they were on the ground above; but whether the inconvenience is greater or less to themselves, I do not know that that is of very much consequence, but I know that their employers will suffer.

2991. I do not speak of personal inconvenience, but if it is at personal inconvenience, they would be slower over their work, which would involve a question of cost to their employers, of course?—It would of course.

2992. Supposing in some subway there were three or four water mains, which is likely to arise, is it not?—Certainly.

2993. And also a certain number of gas mains; and I suppose also telegraph pipes, with a certain number of communication pipes both from the gas and water mains, to the houses on either side, do you not think it would be very difficult, under such a state of circumstances for the workmen to get access to the pipes, for the purpose of doing repairs?—Operating in the subway, would be considerably embarrassed by the projections, and connections, and appliances, which belong to all those affairs which are proposed to be put into the subways, but that will also again depend upon the amount of complication, and the amount of mains; the first person who lays a pipe in the subway will find it all clear

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clear and easy, but anyone who comes to lay a fifteenth, will find the place very much blocked up for him.

2994. And that difficulty will increase, will it not, from year to year, as the demands upon the companies become greater?—It will of course naturally be so, I should say.

2995. You have seen these experimental things which were made in those two streets, Garrick-street and Southwark-street, are they any evidence of what the state of things would be after a short time, with gas mains and water mains really supplying the district?—No, I consider them very small evidence indeed; they lead to no conclusion as to the state the subway would be in, after the use of it has become developed, in the way contemplated by the proposal.

2996. Have you gone at all in any way into the question of the cost of laying the pipes?—No; I cannot say that I have ventured upon any estimate, because, as I said before, the question is complicated, unless you can prescribe a definite number of pipes and certain things, there is nothing to fit an estimate to.

2997. Would the expense of removing the pipes as they are now in the soil, and putting them into the subway, be very considerable?—Very considerable indeed; so considerable, that I should think, with the smaller pipes, it would be economy to abandon the pipes, if such a compulsory enactment as this supposes were passed.

2998. Do you consider that it would entail a very great burden upon the gas and water companies, if they were called upon to pay a rent for the use of a thing which they are compelled to use?—I think the rent is something more than is due under the circumstances.

2999. The Act of Parliament provides, that an arbitrator is to consider what rent each company is to pay, and, in considering what rent is to be paid, he is to take into consideration what benefit the company would derive; do you think that would impose a very heavy burden upon your company?—It is rather a speculation as to what would be the result of an arbitration upon such a point.

3000. At present you have nothing to guide you as to what result the arbitrator would come to upon it?—Nothing at all.

3001. We have heard a good deal about the number of openings in the streets, are the large majority of them openings of about a yard in length?—The majority of them, certainly, in point of number, are of small dimensions; they would vary from one to two yards in size.

3002. Are the greater number of the openings which take place, for the purpose of arranging the cock and plug boxes?—A very large number, and those are openings which I suppose would have to be continued. I do not see any way of continuing the cocks and fire plugs for public use, which would supersede the necessity there is now, of continually repairing and repaving the streets around them; that requires to be done periodically; the street wears, and the stones wear, and they get out of level, the ground is washed away from between the pavingstones, and that leads to repairs being required periodically, and leads to a large number of the openings which we have to make.

3003. They must be brought up to the surface of the street?—Yes.

3004. Those operations must continue to be performed, whether the subways are used or not?—Yes.

3005. It has been suggested by Mr. Bazalgette that, supposing the subways were not sufficiently large as originally made for the demands of the water companies hereafter, they might be enlarged?—Yes; that was the proposal.

3006. Would that, in your opinion, inflict a much greater evil upon the public than the occasional opening of the streets by the gas and water companies to put in new mains?—I think it would.

3007. Have you had any experience of the Metropolitan Railway that would be something analagous to that operation that would involve the opening of the whole width of the street?—I think a second subway, after one had been made, would be rather a torture to the street.

3008, Has anything, to your knowledge, occurred since 1864, to induce you to change your opinion as to the advisability of gas and water companies making use of those subways?—Nothing at all; I do not see now that they are any more desirable than I thought them in 1864.

3009. You have had that little experiment in Nottingham, and those pretty little experiments in London?—That is all that has come to public knowledge; we

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we have a sort of familiarity with a kind of subway of our own in the East London district, which were made, I may say, for the very purpose for which these are made, and made at our own desire and request by the Metropolitan Board themselves, to contain our pipes, but then that was a case of necessity; for the pipes had to be laid under the main drainage, and it was necessary to make them accessible.

3010. Are there any other pipes besides your own there?—Those subways are exclusively for our use.

3011. Are there any communication pipes going off laterally from them?—None whatever.

3012. It is merely an underground trough, carrying mains?—It is merely an underground passage, carrying mains.

3013. On one occasion, I believe, when you were in the Southwark-street subway, you perceived some escape of gas, did not you?—In 1864, there was a sensible escape of gas.

3014. Will you tell us what occurred?—The occurrences were scarcely worth naming, any more than as a simple instance as to the question of applying a light. On applying a light to the issue of gas, those who were in charge of the subway requested me to desist in a quick way, as if they thought that to apply a light, to find out where the escape was, was not a very desirable thing.

3015. *Chairman.*] Where was this?—In Southwark-street subway.

3016. In what part of it?—I can hardly say; I think it was towards the further end, where a gas main crosses in the roof of the subway.

3017. Mr. *Jackson.*] Did you ever see a man upon the top of a gasometer, with a lighted candle, testing for leaks in the gasometer?—No; I have seen a man put a light into a gasometer without any ill effect. The light was extinguished from his doing it.

3018. But have you never seen anyone testing a gasometer to see whether it leaked or not, by a lighted candle applied to the outside of the joints?—I have no recollection of seeing it done.

3019. Mr. *Paull.*] If that were done, and there was an escape of gas into the atmospheric air, that would immediately create an ignition, and the gas would be consumed, as from ordinary jets?—If the issue of gas were continuous from any small orifice, it would light and burn in the air. It is not an uncommon thing where a leak is suspected in the street, for a man to trail a piece of tarred yarn along the street, to see where it lights.

3020. Mr. *Jackson.*] Do you consider if you had a small leak in any of the service pipes, or in any of the mains in the subway, and it was tested by a light, that there would be any danger from that of an explosion?—There would be a certain amount of danger, but the exact degree of that danger it is very difficult to put any measure upon. Accidents such as these always happen where they are least expected.

3021. I suppose no man would descend into a subway, if there was a very large escape of gas?—If there were a large escape of gas, you would have a difficulty in getting a man down.

3022. Therefore his nose would tell him whether there was a large escape, or a small one?—Yes.

Cross-examined by Mr. *Wilkinson.*

3023. One word as to this accident you mentioned in 1864; that leak was not a leak in a main in the subway at all, but it was a leak from a pipe crossing it, laid in the ordinary trench, was not it?—The pipe was positively in the subway; it was carried through the roof of it.

3024. It was carried through the roof; it was the crossing of a main in the subway, so that it was not at all a leak from the main in the subway?—It was a leak of gas in the subway.

3025. It was a leak of gas finding its way into the subway from a main laid in the ordinary way in a trench?—I do not know exactly how the pipe was laid. It was a pipe in the subway.

3026. Did that happen before you gave your evidence in 1864?—Yes; it was the same day.

3027. Did you mention that to the Committee in 1864?—I think so.

3028. You say that you yourself are neither a gas engineer nor a chemist, therefore

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therefore your experience with reference to gas of course relates only to its conjunction with water pipes?—I do not pursue gas engineering at all.

3029. You have no special knowledge as to the formation of gas pipes, or their liability to leakage in respect of their structure?—I think I have as much knowledge on that subject as the gas engineers themselves.

3030. Do you believe in the doctrine of exudation through the metal of the pipes themselves?—Not until the gas pipes become very old. The gas pipes decay and soften, and become completely deteriorated and changed in their nature.

3031. That is from corrosion, I presume?—I do not know exactly the chemical process, nor have I heard it explained.

3032. Would they be more liable to the process of corrosion and deterioration if exposed to contact with the earth, than if they were laid in a subway; does your own knowledge extend to that?—I do not see any difference.

3033. Then you do not consider that the propinquity or connection with the earth at all facilitates the corrosion, or wearing away of the pipes; do I understand that that is your answer?—The propinquity to the earth alone does not expedite the decay; but if an escape of gas takes place into the ground, and continues for any length of time, so that the ground becomes saturated with the gas exhalations, I think then the pipe lying there is more liable to decay than otherwise.

3034. More liable to decay in contact with the ground than in a subway?—If the ground is saturated with gas.

3035. Does not it necessarily follow, in your experience, that the ground is saturated?—It cannot be taken as a general principle; but it is very frequent and very common.

3036. My learned friend asked you whether, since 1864, any change had came over your opinion, and I understood you to say no; you still entertain the same objections that you did in 1864?—I entertain as much objection now as I did then.

3037. Can you state any fresh facts which should induce this Committee to change the opinion at which the Committee arrived in 1864, that so far as water was concerned, there was no possible objection to the introduction of pipes into the subways?—I do not understand exactly on what ground you use the word "objection."

3038. On the circumstances and on the grounds of the decision which you are aware the Committee arrived at in 1864, that, so far as regarded water companies, they were prepared to grant the power which the Board of Works then sought?—The Committee saw no objection, and I do not see any reason why any other Committee should have any more objection.

3039. You can state no fresh facts which have since occurred, so far as regards water, which should induce the Committee to arrive at a different decision from that at which the former Committee had arrived?—With respect to water pipes alone.

3040. With respect to water pipes alone?—No.

3041. Supposing subways to be used solely for the introduction of water pipes, can you state a single objection to the Committee to their being so used?—Objection do you mean upon the part of the Companies, or on the part of the public.

3042. Can you, from your own knowledge as an engineer, representing a company which supplies the east of London, state any objection to the introduction of water pipes not in connection with gas pipes in the subway?—Setting aside the question of expense, I do not see any.

3043. Setting aside the question of expense you do not see any; now a word as to the question of expense; I understood you to tell my learned friend that you could give no evidence as to the first cost, therefore, your evidence as to expense is confined to repairs?—I will not say that I can give no evidence as to the first cost, but I say, that it is a very difficult thing to give evidence that would be properly applicable to the case, from the difficulty of defining the case.

3044. That is to say you cannot define the case sufficiently to give us any evidence upon the question of expense, so far as the first cost is concerned?—No; the case as the Bill stands is indefinite.

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3045. Then your objection as to expense is, of course, confined to the question of maintenance and repair, is it not?—Yes.

3046. One item that you mentioned to my learned friend was, that the men would want more looking after?—Yes.

3047. Will you explain that; how can a man want more looking after in a subway than when working in the hurried way that we have had evidence they do in the trenches cut in the open street?—I do not admit that it has anything to do with the hurried way; there is no hurried way in working in the trenches. A man out of sight will require more surveillance than a man in the street.

3048. Which mode do you think would give most facility of surveillance, the subway, with the facility of constant access, or working in a trench in the open street?—The open ground, certainly.

3049. Do you think, from your own knowledge as an engineer, that your work is likely to be better performed in a crowded thoroughfare, and under the circumstances under which the major part of your work is performed, than in a subway?—I do not see much difference; we take care to have the work well done, and the supervision is chargeable with having the work well done.

3050. You said you thought the men would work slower in a subway; why should they work slower in a subway?—It is a cramped and confined place, and half dark.

3051. You saw the subway in Southwark-street?—Yes.

3052. Did you happen to see the man at work there; a man of considerable bulk?—There were three or four of us looking after him.

3053. You saw that he did his work without much difficulty?—With no more difficulty than such works generally involve.

3054. He did it with as much ease as he would have done it in the open air in a trench?—Quite.

3055. Another question; with regard to the expense incidentally connected with it, was the difficulty of getting to the pipes; do you mean seriously to wish the Committee to understand that there would be a greater difficulty in getting the pipes in the subway arranged according to a system, than there is now in digging into the streets, not knowing what pipes there are, and in what directions you may meet them?—I think so, certainly; when you come to accumulate a number of pipes in the subway, the space round the pipes will be more contracted and confined than we find them now where we have the whole street before us; there is no difficulty in the matter at present.

3056. Would you, in a subway to be formed in connection with a new street, have the same surface of the street that you now have?—That will all depend upon the number of pipes that you get into the subways; the first pipe will have it all its own way, but the last pipe will find it considerably complicated.

3057. Did you hear the evidence of one of the previous witnesses; I think you have been in the room most of the time, have you not?—Yes; I have been here a great part of the time.

3058. Did you hear the evidence given by one of the witnesses contrasting the present state of things as they exist in the street: pipes running in all directions, intermixed and confused: we had a diagram shown upon your side?—I can give you some of my own, if you like.

3059. Contrast that with the system which would be organised in the subways?—These are complications of pipes (*exhibiting a diagram*).

3060. Mr. *Cripps.*] Where does that come from?—The Whitechapel-road and the Commercial-road; those are our pipes alone, as they are at present.

3061. Mr. *Wilkinson.*] Those are your pipes as they exist now in the Whitechapel-road?—Yes; in various places.

3062. Viscount *Galway.*] What is the largest size?—Twenty inches.

3063. Mr. *Wilkinson.*] You could not have supplied me with a more happy illustration. Contrast the present state of things with the state of things which exists in Southwark-street, or which would exist in a properly organised subway, and tell me how you explain your answer that there will be greater difficulty in getting to the pipes in a subway than in the streets?—They cross one another there, but there is no difficulty in that.

3064. Which do you think there would be the greater difficulty in; disturbing underneath pipes, supposing these mains laid in tiers in the subway, supported properly on chairs, or as they are now laid, the necessity of moving the lower pipe, involving of necessity the disturbing of the earth between it and the upper one?—The case of two pipes does not produce difficulty in either way.

3065. Allow me to constrast the two; you tell me that that is one of the reasons you give for saying that there is a difficulty of getting access to the pipes in the subways; I want you to show me in what way, or whether in fact that difficulty is not much less than the difficulty which exists from the present situation of the pipes in the streets?—I do not see any difference; the two pipes are accessible anywhere.

3066. How do you get to the lower one?—By digging under the upper one.

3067. Is there any chance of disturbing the upper one?—Not with reasonable care.

3068. As a question of degree of care, in which case do you think there would be the greater care used; where the pipes were laid in tiers upon chairs, so that it did not involve the slightest disturbance of others, or as in the present case, where the soil must be removed between the two?—There is no difference between them at all.

3069. At any rate that is an item of expense that is got rid of; now, do you see upon the question of expense any unfairness in the provisions contained in this Bill, that you are to pay a rent, provided that the arbitrator is satisfied that economy results to you from the use of the subways?—I do not consider that the companies ought to be charged anything for laying the pipes in the subways.

3070. Not if they save in respect of leakage, and in respect of the expense of laying, and fitting, and repairing, and so on?—Let them bear their share in the construction, as property owners, who are rateable for the construction of the subways, that is sufficient; the companies are already rated largely for all purposes in London.

3071. You told my learned friend that still there would be the necessity of breaking up the streets with respect to the cocks and plugs for the hydrants?—That would lead to the breaking up which comes into the repairs.

3072. Did you see exhibited here models of connecting the hydrants with the lamp posts, and other modes by which all that breaking up would be avoided?—I did not.

3073. Are you not aware that such means have been adopted?—There have been means for converting lamp posts into hydrants.

3074. Means have been devised for obviating that difficulty?—I will not say that it would obviate all the difficulty.

3075. Mr. *Jackson.*] Do you think if you placed a brass service up the lamp post, that you could make that lamp post act as a ventilator?—I do not think it would have much effect.

3076. It would act as a ventilator to a certain extent, would not it?—It would act as an exit for the gas.

3077. Mr. *Wilkinson.*] Have you been in Paris?—I have been in Paris.

3078. Have you examined the subways there with reference to the pipes?—Not with reference to this question; but I have looked into the subways in Paris since the previous Committee.

3079. Do you happen to know that the gas lamps in Paris are used in the way that the Honourable Member pointed out?—I do not know that.

3080. You also made a statement to my learned friend which astonished me a good deal; you said that the water pipes are not less liable to accident in a subway than they are in the streets; do you think there is no less vibration; is the chance of injury by vibration less in the subways than in the streets?—Vibration is a new subject to me; I did not know that water pipes suffer from vibration.

3081. That is quite a new subject to you?—Quite; I was not aware that the pipes suffered from vibration.

3082. Then you do not consider that vibration is an element that ought to be taken into consideration at all in comparing the two systems?—I do not know that there is any vibration.

3083. In the same way as to disturbance in the streets, with reference to shifting pipes causing leakage of joints; is there anything in that?—That is very trivial, if any.

3084. Supposing that it be a question of degree; I suppose the degree would be less in a subway?—No; if there is carelessness of the workmen, I do not see but that it is as likely to happen in the one case as in the other. If the workmen employed by the gas company let down a water pipe carelessly in the process of doing some other works in the open streets, they would be just as likely to do it in the subway.

3085. You compare that with the risk of disturbing almost unknown and unseen pipes in the constant breaking up of the streets, with laying down pipes in the subway ?—The pipes are always seen when they are reached in a trench, there is nothing unknown.

3086. You were also contrasting the danger of water pipes bursting, and you said that you anticipated more serious effects from a water pipe bursting in a subway; that again astonished me; can you explain that ?—The effect of the accumulation of water when a burst takes place, is more liable to disarrange the earth and other things which are round and near it in a subway, than in the open street.

3087. In a subway, with the ample facilities which we have had described of gratings and openings for the escape of the water ?—The facilities are more ample upon the upper surface, the facilities are confined and narrowed below.

3088. As I understand, you were putting the case of a pipe bursting upon the surface ?—I put the case of a pipe having burst.

3089. You said that the first indication of that accident, would be an escape to the surface ?—Yes.

3090. That would involve, would it not, a complete saturation of all the adjoining soil ?—No; the roads do not become saturated; they are as hard as bricks.

3091. Would not it cause a disturbance of the soil ?—Not unless the issue was a very violent one, in which case it would blow up the ground and make a hole.

3092. As to the variation of temperature, do you think it would be less or greater in a subway ?—I think it would be rather greater than less.

3093. You think it would be greater; is that your experience; have you been in the room when the evidence was given of a year's variation of the maximum and minimum of the temperature in a subway as contrasted with the maximum and minimum of the temperature on the outside ?—The pipes are not outside; they are buried; I am not aware that anybody has been buried in the pipes to ascertain the temperature.

3094. I ask the question as regards the variation of the temperature ?—There is no comparison in the case; you cannot make a comparison between the temperature of the air in a subway, and the temperature of the air in the open ground above, because the pipes are not laid in the open ground; they are buried, and therefore the variation of the temperature, where the pipes are buried, is very small indeed.

3095. Did you hear the evidence given of moisture carrying the frost down into the earth, and so affecting the pipes ?—No.

3096. Do you believe that the moisture would do so ?—You generally find the roads very dry below the surface.

3097. With regard to detection; do you seriously think that detection would be less easy in a subway, where the whole of the pipe is exposed, than it is now in the street where the pipe is laid in a trench ?—That again would depend upon the degree of surveillance that the parties in charge of the subway would exercise in it.

3098. Assuming the same degree of surveillance to exists now to exist then, do you wish the Committee to understand that the facility of detection is less in the subway than it would be upon the ground; the detection of any injury to the gas pipes causing leakage particularly, or the water pipes ?—The liability is, that the accumulation will take place before the issue is detected.

3099. You tell me that, in the ordinary case, an escape is only detected when it reaches the surface; contrast that with the subway, and I ask you whether the detection must not take place necessarily much more immediately than in the other case ?—If you imagine a patrol established in the subway, then all these things would be very soon taken notice of, and that would be the proper way to carry them out; all these escapes would be very soon taken notice of then.

3100. Do you not know that it is part of this system that a proper and constant supervision should be exercised ?—I do not see any provision for it whatever; but if there were any such provision in the Bill for the detailed management

ment of the subway after completion, then I do not see but that a great deal of the difficulty which I have supposed, would disappear.

3101. Then I understand you, that with proper supervision those objections that you have dwelt upon to my learned friend would be very much mitigated, if they would not disappear altogether?—The subways when constructed ought to be under some party's charge, and if they were under control, the danger from any accident might be reduced to a minimum.

3102. Now, as to the Burdett-road, that is a street opening up a considerable amount of ground not built upon, is not it?—It is ground that is only now becoming built upon. A great deal of it was vacant when the road was made.

3103. Therefore, so far as these new houses which will be built upon it are concerned, there would be ample means of providing for the introduction of service pipes in connection with the mains laid in the subway, would there not?—I do not quite understand your question about "ample means."

3104. I mean that there are not houses built upon each side throughout the street now?—No.

3105. It is not a case of altering existing means, but it is a case of providing new means altogether, is it not?—The road is almost entirely new; not altogether.

3106. The greater part of the road remains to be built upon; I mean the houses to be built upon the side of it?—I should think that perhaps three-fourths of it has to be built.

3107. Now, as to the Whitechapel Improvement?—The Whitechapel Improvement is the case of a new road to be cut through existing covered ground, ground covered with houses.

3108. The Whitechapel Improvement is the place of which you have given a diagram, where your pipes are so much interlaced at present?—In the neighbourhood of it.

3109. Will there be any difficulty in providing a subway sufficiently large there to enable you to arrange your pipes on a much better system than they appear to be shown there?—We shall not re-arrange the pipes; we shall possibly lay one new main through the street, and lay the services, but I am not aware that in that case there would be any call upon the East London Waterworks Company to add largely to the mains in that neighbourhood.

3110. Then that presents no material difficulty to your mind?—No; no material difficulty.

3111. You mentioned one case, as to the difficulty of introducing your large mains into the subway; where you in the room when Mr. Bazalgette showed a diagram explaining the mode in which it was done by means of a crane at the top letting them down through the openings?—I read the evidence in which Mr. Bazalgette stated that he proposed to avail himself of laying the mains in that way; but I should rather prefer, if my pipes were to be put down in the subway, laying the mains in before the crown of the arch was put on.

3112. Supposing the crown was put on, would not that plan which was proposed by the engineer be a very facile plan indeed?—To make a hole in the top and let them down?

3113. To let them down in the way he suggested?—I do not know that there is any particular facility in it; if the pipes are there, and they are to go in, you must have a hole to put them in, whether it is at the side or at the crown of the arch.

Re-examined by Mr. *Clerk*.

3114. If you had to lay a new main in any one of those subways, you would have to put all your pipes down this one hole, and bring them in one after another, and then take them to the place where they were to be laid?—If they were to be put in at one hole, it would be so; but I suppose they would give us more than one hole.

3115. Then you would have to open the street in several places for that purpose?—Yes.

3116. As to that diagram, at present you find it necessary to have your mains cross each other?—The mains cross, and interlace with the mains of other companies.

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3117. Supposing you were driven into the subway, would that take place in the subway as much as it does now on the ground?—Certainly.

3118. My learned friend suggested to you that the difficulty would be obviated by having the pipes in tiers in the subways; supposing the pipes to be placed in subways on chairs, would that prevent you from getting access to those side passages which give a communication into the houses?—Of course it would obstruct the side passages.

3119. It would make it more difficult to work in the subway?—It would make it excessively difficult; complications of extreme difficulty would occur in the subway; no question about that.

3120. The question affecting the water companies is mainly a question of cost, is not it?—Mainly a question of cost.

3121. You, as an engineer of experience, I believe, see no advantage which the water companies can derive from going into the subways?—I am not aware of any gain the water companies will acquire.

3122. Supposing that the water companies only were forced into the subways, would the public, to a certain extent, still suffer the inconvenience which is said to arise by the gas companies breaking up the streets?—As far as our knowledge goes, which is not precise, because it has not been directed to the point, the openings of the streets for gas purposes are more frequent than those for water purposes; there are also openings for telegraphs, sewers, and for drainage, which also add very largely to the total number of openings.

3123. Supposing that the water companies had to lay their mains in the subway, and the gas companies were in the ground above, that leakage which is complained of in the gas companies' pipes would still continue, would it not?—That leakage would continue in the soil, and the leakage would find its way into the subway.

3124. Do you apprehend that there would be, under those circumstances, a great chance of the leakage upon the gas pipes finding its way into the subways?—There would be a chance; it would occur occasionally, I suppose, not always; it would not be always happening.

3125. The only thing suggested by the promoters is constant supervision; how to secure the safety of the new subway; would it require a constant patrol in the subway, to see that there was no escape of gas?—There ought to be a custodian in every subway, who should have the direct charge and duty to pass through it at certain periodical times.

3126. Day and night?—Yes.

Chairman.] Sundays and working days?

3127. Mr. *Clerk.*] Sundays and working days, because, during Sundays, there might be an accumulation of gas sufficient to send you to a place, I will not say where, on Mondays?—Yes; besides the liability to thieves and intruders getting in from unfinished houses; all that would require looking after.

3128. Mr. *Cornwall Legh.*] I understood you to say that, with proper supervision, you consider that the danger of any accident may be reduced to a minimum?—Yes.

3129. In your judgment, who is to be responsible for that supervision, the waterworks company or the subway company?—I should say the parties in whose interest the subway is constructed, decidedly. They ought to have a certain degree of satisfaction accorded to them in carrying out the works by those who are to use the subways, so that nothing foolish or ridiculous shall be done by spite or mischief, and that they should be charged with the maintenance of the subway who undertake the supervision of it.

3130. In that case you think that those companies who use the subways should pay a rent?—I do not see how the companies are to benefit sufficiently to make them duly chargeable with rent.

3131. But any expenses such as you refer to now would have to be decided by some authority, an arbitrator, or some authority of that sort, would they not?—If that must be, it had better be decided by arbitration than in any other way.

3132. Would that, in your opinion, be a satisfactory way of bringing the two parties together?—I think it is so clear that the benefit would be nothing at all, that it is better it should be left a settled point that nothing is to be paid for the use of the subways.

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3133. *Chairman.*] Take it for granted, you mean?—Yes; I should take it for granted.

3134. Mr. *Cornwall Legh.*] Take for granted what?—That no rent is to be paid for the use of the subways.

3135. And that it should be decided by arbitration?—I think if the subways are constructed out of funds raised in the ordinary way, that that proportion which would fall upon the companies as the property owners in London would be a sufficient burden upon them, and that they should not be asked to pay a rent in addition.

3136. Mr. *Paull.*] Have you calculated the percentage of leakage from water pipes in 100 *l.* worth of water?—No, I have not; it is unknown altogether; it is very slight.

3137. There is a very slight per centage of leakage?—A very slight leakage indeed, in the sense in which I suppose you mean it, namely, from the joints and from badly executed work; the leakage of water is mostly within the premises where the water is supplied.

3138. We have heard that in the case of the gas companies, the leakage is so great in the roads, as they now are, that if they were put in the subways there would be a great saving; that is not the case with water, is it?—Certainly not.

3139. Did I understand you to say that if you were called upon to remove the pipes already in the ground into the subways, or rather if you were called upon to occupy the subways, you would rather leave the old pipes in the ground than be at the expense of removing them?—Certainly; if the streets were already paved; the pavement would have to be removed, and the expenses of breaking up that paving and repaving it would have to be balanced against the value of the pipes; the pipes have to be got out of the hole, and it would be far better to leave the small pipes in the ground, and say nothing about them, and lay the other pipes entirely new in the subway.

3140. Then the original cost of putting down the pipes would be an absolute loss of capital?—Quite so; threes, fours, fives, and sixes; it would not be worth while to take up a street like Southwark-street.

3141. Would it be worth while to dig up 2-inch pipes?—I should think it would; I could not say precisely where the limit would be found; but of course it is a question of degree entirely.

3142. In the smaller pipes there would be the loss of the original laying down of the pipes in the roadway, and there would be the cost of the new pipes for the subway?—The total cost, the original cost of laying them; then the pipes to be recovered would probably be deteriorated by age, and they would be damaged in disjointing them, and probably would only be of use as old iron when recovered.

3143. *Chairman.*] You think it might be cheaper to abandon the pipes than to take them up?—No doubt it would be cheaper to abandon the smaller pipes, but to what extent I could not say.

3144. That would depend, I suppose, upon the age of the pipes and the corrosion?—Yes.

3145. Mr. *Paull.*] How long does a water pipe last if it is not damaged by vibration, and if there has only been an ordinary use of it?—I have heard the life of a water pipe stated at 40 years, but that would depend upon the thickness; the smaller pipes are more liable to decay from bad soil. I took up some pipes some years ago that had been in the ground 100 years; they were iron pipes, perfectly sound, and in a beautiful state of preservation, some of the earliest pipes which had been cast by old Wilkinson, in South Wales.

3146. So that in effect, if you were called upon either to remove or relay those pipes in the subways, the rental you received in respect of the supply of water would be payable upon the capital employed in the two services?—The value of the new pipes would have to be added to our capital, and the cost of the old ones would remain as a cost already incurred.

3147. But the cost of the old ones would have been so much capital to which the returns obtained from the new ones would be applicable?—We should be saddled with the cost of the new pipes entirely.

3148. You would have a double capital to pay upon, in fact?—Yes; so far as the new pipes were concerned.

3149 Viscount *Galway.*] Your great fear of putting pipes in the subway appears

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pears to be the expense of putting them there?—I do not think there is any other difficulty worth naming with regard to water.

3150. You do not think that any leakage would come from those pipes sufficient to do any great harm in the subway?—I am quite sure there would be no leakage worth talking about, there is no leakage in any continuous sense; we have accidents here and there from split pipes and blown joints, and occasionally breakages from bruises, but they would occur as much in the subways as elsewhere.

3151. Have you at all heard or has it been suggested, if there is to be this rent, what rate you would be charged at per mile in the subway?—I have not considered that point.

3152. You have been in the subways; do you agree with Mr. Forster, the witness we had on Friday, that there is no ventilation in the subways?—I should say there is no ventilation in the subways that are constructed, in the sense in which I understand ventilation, there is no movement of air, and there would be no movement of air unless there was a strong breeze, and then there would be a movement of air in the subway which would vary with the wind.

3153. Does not it depend upon the state of the atmosphere?—Yes.

3154. If there is a breeze, there would be ventilation?—If there is a breeze there would be a movement of the air in the way the wind blew; in those horizontal passages we find that to be the case.

3155. Mr. *Cornwall Legh.*] Is there any sediment deposited by the water going through the pipes?—There is a deposit takes place which serves to enamel the pipes, I may say all over, as much upon the top and sides as the bottom. It forms a coat all round, with a thin film of about the thickness of two sheets of paper.

3156. *Chairman.*] Is that lime?—Carbonate of lime.

3157. Viscount *Galway.*] Is your water all filtered?—Yes.

3158. Mr. *Cornwall Legh.*] Does that deposit at all deteriorate the pipes?—Not at all; on the contrary it has rather a preservative and beneficial effect. In fact, for the last 10 years, whenever I lay new pipes, I whitewash them inside, to imitate the natural effects which I expect to take place by the deposit from the water.

3159. There is no sediment or deposit from the water used in London, which has a prejudicial effect upon the pipes?—No sediment whatever, nor any corrosion inside.

3160. Mr. *Duff.*] Supposing a fan were put in, might you not ventilate the subway by a fan?—Artificial means might be introduced for carrying out any degree of ventilation you wish to prescribe.

3161. Then there is no practical difficulty in ventilating the subway?—It would be rather a troublesome thing to have an apparatus for producing ventilation, but there is no difficulty that might not be surmounted.

3162. The subway might be properly ventilated?—I think it would be better to ventilate it by a chimney draught than by any mechanical means; I think some means might be found, such as an elevated shaft that should produce a natural current at all times.

3163. But there is no practical difficulty in ventilating a subway by mechanical means?—No; if you choose to go to the expense of mechanical means; of course any degree of blast or draught may be created.

3164. Mr. *Floyer.*] If the tendency of the deposit from the water is to preserve the pipes from decay, is there any other cause of decay that occurs to you, supposing the pipes to be laid in the subway so as to be kept free from rot, either by painting or other appliances?—There is no other cause of decay in water pipes but the external rust.

3165. That may be guarded against, I suppose, by a coating of paint, or some other process?—As to a coating of paint; I do not know whether it would be worth painting them; the paint would have to be renewed frequently; it would depend upon the cost of painting, and the increased durability of the pipe, whether it was worth doing or not. Iron, in confined places, is always liable to rust and to scale, and throw the paint off; they would require to be scraped and re-painted.

3166. *Chairman.*] That does not apply to any extent to cast-iron; to wrought iron it does?—If they are laid under cover, the pipes will rust.

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3167. Mr. *Jackson.*] Cast iron does not scale like wrought iron?—Not so rapidly as wrought-iron.

3168. Mr. *Floyer.*] As to the costs of repair, are you in the habit from time to time of breaking up the streets and substituting portions of new pipe in repair for old ones, and keeping the remainder of the old pipes down?—It generally entails the substitution of a piece of new pipe.

3169. When you substitute a piece, that means a whole length, I suppose?—A whole length, or a half; we cut out half a length, or a portion, frequently.

3170. The water districts are not divided by authority of law, as the gas districts are, are they?—They are divided by consent.

3171. Without Act of Parliament?—Without Act of Parliament.

3172. So that the pipes, mains, and services of one company do not interfere materially with the other?—I believe there is only one instance in London where there is any interlacing; the boundary between our company and the New River Company was settled by agreement in 1815, and we have not trespassed over the line since.

3173. Are there any causes that occur to you that are likely to lead to much more use or alteration in the service of the district, after the houses have been once built, and thoroughly, and properly, and adequately provided for?—Only such causes as may be included in the larger kind, such as that to which we are subject ourselves this year. Finding our supply from the river from which we have hitherto drawn our water insufficient, we have been obliged to apply to Parliament for power to obtain a supply from the Thames. In doing that, we have to drive a main of large diameter through 10 or 12 miles of London, and, of course, a main brought in that way is a great derangement of the existing system, and is something entirely unexpected.

3174. That is owing to the previous service having been inadequate?—The previous quantity of water that came being inadequate; and so again also you find the Chartered Gas Company going down to Barking Creek to buy a large estate, and to establish entirely new works, and to bring their gas by a carrier main the whole length of the Commercial-road.

3175. That again is because the supply of gas forthcoming was inadequate?—Because for reasons which a short time ago were unknown and unthought of, it is now considered desirable that they should move from the heart of London to a suburban neighbourhood to make their gas.

3176. That having once taken place is not likely to occur again?—That is a question for the company to determine; I should think they would hardly lay mains in now, sufficient for all time, if the whole of the gas to be made by the Chartered Company is to be made at Barking Creek, and to be brought into London, they will not encumber their capital with a provision of 25 years to come; the supply of gas of every company, however limited their district may be, is found to be continually increasing.

3177. *Chairman.*] Do you imagine, as a practical engineer, that with care there would be any difficulty in introducing ordinary house services into the pipes, either of gas or water; there will be no escape of water, and if there were it would not signify; and I suppose, sufficient care being exercised, there would be no escape of gas that one need care about?—You mean the question to apply to a subway being made, where the arrangement for the houses can be pre-arranged, and where the whole main may have small pieces of pipe previously connected, and arranged ready for every house that may be built in the street.

3178. There need be no apprehension of casualty upon that score?—There will be casualties and accidents arise no doubt, do what you will.

3179. But not from that cause?—I do not think you need fear them so greatly as to consider them a negative of the whole proposal, certainly not.

3180. Viscount *Galway.*] You do not think there is any fear of the water being contaminated by the gas, do you?—Not in the subway.

3181. *Chairman.*] Did you happen to pass along Southwark-street on your way to this house, or anywhere else at the time that a trench was cut on each side of it, to lay down a 6 or an 8-inch water main?—I saw them laying a water main on the south side, a 15-inch or something of that sort; but I did not see a trench on both sides.

3182. A 15-inch main?—Yes.

3183. Was there any reason in your judgment, why that should not have been quietly

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quietly put in the subway underneath, instead of cutting up the street from end to end?—I am not aware that there was any mechanical or engineering reason.

3184. Supposing it was offered for nothing?—No mechanical reason.

3185. Did you experience any inconvenience yourself in driving along there; was the street stopped?—The street was not stopped; I came through it several times while the pipe was being laid.

3186. At the Blackfriars' end had not you to go through the arch there, and then along an old street?—I do not recollect that interruption myself.

3187. With regard to ventilation; there is a shaft in Southwark-street at one end, and a great mass of lights, and there is one also in the borough; now, if one of those shafts was lighted so as to produce warmth in the chimney of the ventilating shaft, one of those shafts terminating in the crown of the arch, and the other at the other end, terminating with the base of the subway, do you imagine that a sufficient current would be set up there as always to have a current of air throughout?—I am not of opinion that it would create any appreciable current.

3188. Not exercised in that way?—No.

3189. Mr. *Floyer.*] Not independent of any wind-blowing?—No; to produce the effect which the honourable Chairman proposes, I think the shaft should be higher than anything that could be constructed in the nature of a lamp post.

3190. *Chairman.*] It is not a lamp post; it is a mass of lamps, with a very large base stone; you must have seen it; the height is very considerable?—I have seen it repeatedly; I should think it would take a chimney of 40 feet to do any good.

3191. You think 40 feet would do it, if you went to the crown of the arch at one end, and to the base of the subway at the other?—I think that less than 40 feet would not produce sufficient sensation to draw the air.

3192. If it were 40 feet, would it?—I would not guarantee it, but I think it would.

3193. Mr. *Floyer.*] Would it produce that effect if the wind were blowing in the contrary direction, because, as I understand the Chairman's proposal, it is that the air is to be introduced at one end of the subway, and to go out of it at the other end?—Yes.

3194. Now, you say, according to your view, that would operate very well if the wind was blowing that way; but supposing the wind was blowing in the contrary way to that in which the suggested ventilation was to operate, what would be the effect?—Then to get over the difficulty you must have a chimney at either end, so as to be able to shut one when you wanted the other.

3195. That would require attendance whenever the wind changed?—Yes.

3196. *Chairman.*] You seem to think that if the chimney was 40 feet high, it would do it?—I think a 40-feet chimney would create a sensible and sufficient movement in the air to ventilate the subway.

3197. Mr. *Floyer.*] Only to be depended upon by the means you have mentioned?—Only to be depended upon if the wind were not sufficient to counteract its effects.

3198. Mr. *Jackson.*] If there is a shaft at each end it matters not which way the wind is, you would have a current of air both ways, would not you?—I am not a sufficient miner to decide that point.

3199. Mr. *Bagwell.*] The tenor of your evidence is this; that if there was a subway made in which you could put your water pipes without expense you would prefer that method to laying them in the streets?—I should lay them willingly; I would not say that I should prefer it; I see no difficulty.

3200. Do not you think there would be less expense putting them in a large subway, such as that on that plan, than in digging the ground from three to four or five feet down, taking up the pavement and replacing the pavement, and renewing the pavement again after a certain time, and very likely a third time renewing the pavement again?—We do not do that.

3201. It has been given in evidence, over and over again, that when you dig up a street to put down your pipes, whether it be a paved street or a macadamised street, after the trench has been made for laying down the pipes, and you have put your pipes in, and it is filled in again, after a certain time you have to do it over again because the earth sinks?—Seldom more than a second time.

3202. Always a second time; it has been given in evidence, because it sinks

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sinks, and it has been very frequently done a third time?—I have had many hundreds of cases where it was only done once.

3203. *Chairman.*] Where there was much traffic?—Yes. If the first paviors are careful, and will take sufficient pains, it need not be done a second time. In laying in a pipe it is the object of the contractor to get all the stuff in, and not to have to cart any away. Our idea of laying a water pipe is that the ground will be generally tighter where a new pipe is laid than it was before.

[The Witness withdrew.

Monsieur *Marie Francois Eugene Belgrand* called; Examined by Mr. *Clerk.*

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3204-5. You are the Inspector General of the Ponts et Chaussées, in Paris, I believe?—I am.

3206. That is the Government Department of Civil Engineers in France, I believe?—Yes, and I am the Director General of Sewers and Waterworks.

3207. Is the conduct of the sewers and waterworks in Paris under your control?—I have the control and direction of all waterworks and sewers in Paris, and also of gasworks.

3208. Have you the control of the water in Paris, or only the direction?—I have the control and direction of all gasworks, waterworks, and sewers in the City of Paris.

3209. Has the Paris gas company a concession from the municipality?—They have a concession from the municipality of Paris.

3210. In that concession did the municipality reserve the power of making the gas company go into the subways?—Certainly; this is the actual clause in the concession which I am now about to read.

3211. Mr. *Rodwell.*] What is the heading?—Paragraph 1, article 3, of the treaty of concession to the gas company of Paris for the lighting of the town; "If the municipality think fit they can, during the duration of the concession, compel the gas company to lay relatively, and to place pipes together, and the gas company will be compelled, in all places of the town, to place the pipes in the galleries."

> *Chairman.*] The meaning of that, I suppose, is that the town might have the power, if they thought fit, of compelling the gas company to place their pipes in the galleries.

3212. Mr. *Clerk.*] Have many galleries been constructed by the municipality in Paris?—There are very few subways for gas and water pipes, but there are a great many sewers.

3213. Has the gas company been called upon to put the clause in the concession into force?—The company have never been asked to put this clause into operation; the town has not ventured to enforce this clause.

3214. For what reason?—Because there was such danger in enforcing the companies to lay the gas pipes in the subways, that it has not dared to do so.

3215. Was M. Mary Inspector General of the Ponts et Chaussées, in the year 1830?—He was at that time attached to the municipal service.

3216. About that time, 1830, did M. Mary take up the only gas pipes which had been laid in the municipal subways?—M. Mary, the engineer, has taken up the only pipes that had been laid in the subways in Paris; that was in the Galerie des Martyrs, after three explosions.

3217. Is M. Mary an engineer of great experience?—He is an engineer that held a very high position in the service, and is a man of very great ability.

3218. At the present time what length of gas pipes are there in any of the subways in Paris?—There are 1,200 metres of pipes laid in the subways in Paris, if you take into account those placed in the Napoleon III. Square, but if you do not take those into account, there are 460 metres in length.

3219. Counting the bridges of Paris?—Counting over the bridges in Paris.

3220. Are those 460 metres only on the bridges of Paris?—The 460 metres of gas pipes laid in the subways, are on the bridges of Paris only.

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3221. Are not the gas pipes in the subway of the Napoleon III. Square under the control of the municipality?—They are not under the control of the municipality.

3222. When were those pipes laid in that gallery? — About the year 1856.

3223. Were they placed there against the advice of the municipality, and of the Paris Gas Company?—They have been placed there against the wishes of the municipality and of the gas company.

3224. Have you learnt from your assistants that an explosion took place there in the year 1861?—I have heard that there was an explosion in the year 1861, but that explosion was not a serious one; the company received the same information.

3225. Then there are gas pipes on the bridges Pont Neuf and others?—Upon the Pont Neuf, the Pont Notre Dame, the Pont Aux Double, and Le Petit Pont.

3226. Was the first intention in Paris to construct special subways for gas and water, like those which are now being constructed in London? —Two subways have been constructed in 1815.

3227. The first idea of galleries in Paris was similar to those that now exist in London?—They were about the same size and the same form, as nearly as possible, as those that have been constructed in London.

3228. The Galerie des Martyrs, and the Galerie Saint Laurent, were constructed about 50 years ago, in 1815?—Yes.

3229. Were those galleries in continuation or separate?—They were in two separate streets, 500 or 600 metres apart, in the Rue des Martyrs and the Rue Saint Laurent.

3230. What is the length of those galleries?—The two were about 1,400 metres long.

3231. What was the length of the Galerie des Martyrs?—About 700 metres; about half.

3232. Was the gas laid in the Galerie des Martyrs only?—Only in the Galerie des Martyrs.

3233. Was it after three explosions had taken place that Mons. Mary had these pipes taken up?—It was after the explosions that Mons. Mary had the pipes taken up in 1832.

3234. Do you know when the explosion took place; when was the last explosion?—I have not been able to get the exact date. I believe probably a short time before the pipes were taken up.

3235. They were taken up in 1830?—They were taken up about 1832.

3236. Did you hear from Mons. Mary whether the accidents were serious?—Sufficiently serious to induce them to take up the pipes.

3237. Mr. *Rodwell.*] Is Mons. Mary alive?—Yes.

3238. Mr. *Clerk.*] Is he an old man?—He is 75 years old.

3239. Have several serious accidents occurred in the subways upon the bridge?—There have been several serious accidents in the galleries on the Bridge of Austerlitz.

3240. Have those accidents occured on the Pont d'Austerlitz only, or on any others?—Only on the Bridge of Austerlitz.

3241. You were examined here in June 1864?—Yes.

3242. Did you then mention that an escape of gas had taken place on the Pont d'Austerlitz?—Yes; on the 5th March 1864 there was a very serious escape of gas at that date.

3243. A man had gone down into the gallery the night before, and was taken up in the morning unconscious?—He went down the same day.

3244. How long had the man been in the gallery?—He remained only a very short time in the gallery; he was taken up in a suffocating state.

3245. Does that incident appear to you to be one of great importance?—I consider it was of very great importance, because it proves that notwithstanding all the precautions that are taken for ventilation, when you find by the smell of the gas that there is an escape, it would be very difficult to go down into the subway, to find where the escape of gas takes place; it would be very difficult to go through an atmosphere so dangerous.

3246. An atmosphere at once inflammable and suffocating?—It would be very difficult, indeed.

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3247. At the time when this accident happened, were there any means of ventilating the gallery on the Pont d'Austerlitz?—Yes there were six ventilators in the subway on the bridge of Austerlitz.

3248. What is the length of the galleries at the Pont d'Austerlitz?—One hundred and ninety-three metres.

3249. I understand there are six openings in that subway?—There are six shafts or ventilators; they are in the footpath.

3250. Is there a ventilating hole every 30 metres?—There is a shaft about every 30 metres.

3251. Did those openings come in the pavement?—They go up to the pavement.

3252. What is the size of the opening in the pavement?—About 10 inches, 80 centimetres.

3253. What is the diameter?—Ninety centimetres.

3254. There is a trap, which is ordinarily closed, but there is a hole in the trap which is always open?—Yes.

3255. That hole is eight centimetres long and three centimetres wide?—Yes.

3256. *Chairman.*] Means exactly like ours of opening the trap?—Yes.

3257. Mr. *Clerk.*] It is three inches in length?—Yes.

3258. About the time, and prior to the time when this accident happened, had the old trap been opened?—

Mr. *Rodwell* objected to the question as being evidence of hearsay.

3259. Mr. *Clerk.*] Were those traps open at the time when the accident took place, or only the small one open?—

Mr. *Rodwell.*] How late has he seen the trap?

Chairman.] The translation of the report he made to the municipality is in evidence.

3260. Mr. *Clerk.*] Did the workmen, when they were at work in the galleries, leave the traps open, or were they closed?—They were all open.

3261. Do I understand that the trap was open, or the hole of the trap was open?—When the workmen were carrying on their work in the subways they always had the trap open; I learnt from the engineer of the gas company that all the ventilators were open when the accident took place in 1865.

3262. At the period of the accident in 1864, when the men were almost suffocated, was there the same system of ventilation that there was in 1865?—Exactly the same system.

3263. At the period of the accident in 1864, were the ventilators open in the bridge?—I have indefinite information on the subject, but it is very probable they were.

3264. Do they in practice open all the ventilators in the gallery when they are all working in the gallery?—Generally the ventilators are open, but certainly the two ventilators nearest to which the workmen are at work are open.

3265. Was there a serious explosion of gas on the 25th January at the Pont d' Austerlitz?—There was.

3266. What size of gas pipe was there in the gallery at that time?—There was a water pipe of half a metre in diameter, and a gas pipe of half a metre in diameter.

3267. Had the men been at work for about a month in relaying the gas pipe in that neighbourhood?—They were working for about a month in taking up the old gas pipe, and laying down a new one; the work was very nearly completed on the 25th January.

3268. Was the ventilation secured not only by the six openings spoken of, but also by two trenches at the extremity of the bridge?—At each end of the bridge there was an opening, which left each end of the subway perfectly open.

3269. At this time, did you ascertain from the engineer of the gas company that the ventilators were left open while the men were at work?—I have received the information from the gas company. It is certain the ventilators were open, because there was a workman looking after each ventilator open as a workman was found on the pavement.

3270. No accident had occurred during the month?—There had been no accident

dent that month, and it was believed that with that system of ventilation there would have been no accident.

3271. From the precautions they had taken, they did not expect there would have been an accident?—Exactly.

3272. Had the new pipe been joined on the left bank to a gas main?—It was united with the old pipe, and there was a valve or cock uniting the two.

3273. Did it appear that valve was perfectly secure?—It was perfectly secure, as the workmen had been at work the evening before, and they had, in working in the gallery, used candles and lights.

3274. In the neigbourhood of the new pipe?—They had been working the whole of the day before round the new pipe with candles.

3275. The end of the pipe towards the right bank was still open?—It was quite open.

3276. On the morning of the 25th January, did a severe explosion take place there?—Yes; there was an explosion on the morning of the 25th January, at 12 minutes past nine.

3277. Was the roof of the gallery blown out?—The gallery was blown up 160 metres in length. The rest of it was so damaged that it had to be rebuilt.

3278. Was the gas pipe entirely destroyed?—The gas pipe was completely destroyed. The water pipe was burst in one place only. The water pipe burst, and the force of the water destroyed the gas lamp, which was on the pavement on the other side of the road of the bridge, and established a fountain.

3279. Did the force of the water damage the bridge?—The force of the water smashed a gas-lamp on the other side.

3280. Were two of the company's men working there, killed by the explosion?—There were four workmen employed on the works at the time; three workmen on one side, and one workman on the other; two were killed; one immediately, and one died shortly afterwards, and the other two were more or less seriously hurt.

3281. There was only one passer-by on the bridge at the time?—Fortunately, it rained hard at the time, and there was only one passenger on the bridge, a lady, and she was thrown down, but she got up again, and was not hurt.

3282. Was there an inquiry immediately instituted to ascertain the cause of the accident?—There was an inquiry immediately after the accident took place, and M. Mary was authorised to investigate the matter.

3283. Have you M. Mary's report?—It is here. (*The report was produced, and it was arranged that a translation should be made, and a copy placed on the Minutes.*)

3284. What appeared on inquiry to be the cause of the accident?—M. Mary thinks that the accident was caused by damage to the valve. At the time the workman, who was a mason, was working by the valve, it was presumed that he let fall a stone on the top of the valve, which damaged it and allowed the gas to escape.

3285. Did it appear whether the gas had escaped into the subway?—There is no doubt that the gas escaped into the subway, because on the night previous some workmen had made five or six holes in order to make a connection between the main pipe and the lamp post.

3286. Did it appear that notwithstanding the ventilation that existed, an explosive mixture had been produced in the gallery?—Notwithstanding the two ends of the subway being opened, and the six ventilators, the gas mixed with the atmosphere in the subway, formed an explosive mixture, and the explosion took place.

3287. And had this explosive mixture been formed without attracting the notice of the workmen?—The workmen did not discover it, because if they had done so, they would very soon have left the works.

3288. Did it appear how the explosive mixture in the gallery had been set fire to?—M. Mary believes that the explosion took place in consequence of a lighted lucifer being thrown into the subway.

3289. Was there any evidence as to where the explosion commenced?—There was none; the explosion was so sudden, it was like a clap of thunder.

3290. After the explosion took place, were means adopted to carry off all the gas from the gallery?—The whole thing has been reconstructed; the water is in an open subway, and the gas pipe is laid in the subway, and enveloped in sand.

3291. Have you seen a report made by Mr. Bazalgette and these other gentlemen?—Yes, I have read the translation.

3292. They express a doubt whether there were ventilators of the subway and of the Bridge of Austerlitz at the time of that accident?—There is no doubt that these ventilators existed before the accident took place.

3293. The report says, that the explosion took place in the gas pipe, and not in the subway?—There were four or five holes made in the pipe for the purpose of connecting them with lamp posts, and there is no doubt that the explosion took place in the subway and in the pipe also; Mr. Bazalgette has had a report of mine, that was made two or three hours after the accident.

3294. At the time, had you not obtained full information of the accident?—At the time I had not all the particulars.

3295. Now, if this accident had occurred in a gallery in a street, would it have been attended with most serious consequences?—If there had been at the time from 150 to 200 persons on the pavement, the explosion might have been a very serious one.

3296. Are you satisfied that the means of ventilation which exist in a subway, are insufficient for the removal of an explosive mixture?—I saw on the bridge, that that was not enough, but what may be enough I cannot tell you; I have visited this morning the subways, and have practically tried the system of ventilation in the subways by means of a candle, and I found that the ventilation there is in fact scarcely any ventilation at all; the draught was a downward draught, and if there was any current, it tended to blow the flame of the candle into the subway.

3297. Have you made any experiment in the subways in London, to see whether the ventilation is sufficient to remove an explosive gas?—I have not made any experiments in London, but I have done so in Paris; I have placed a candle at the mouth of the ventilator in London, and I have found that the draught descended instead of ascending.

3298. Have you made considerable experiments in Paris to ascertain the sufficiency of the ventilation of the sewers there?—I have instructed my assistant, M. Rousselle, to make experiments in the sewers in the Boulevard de Sevastopol upon the method of ventilation, and I found that there was no sufficient ventilation in the sewers.

3299. Are there in that Boulevard ventilating shafts?—There are ventilators, besides ventilating shafts, which ascend as high as the houses, that is about 20 metres high, or about 65 feet above the pavement.

3300. Are there many of those?—At each house.

3301. What distance from one another?—It is very variable; they are at different distances, probably about 20 metres apart.

3302. Do you find that, excepting in the neighbourhood of the river, there is a very faint current of air in those sewers;—Yes; unless it is in the vicinity of the river, the current of air is very feeble, indeed.

3303. Has your opinion been in the least degree altered with regard to the policy of putting gas pipes in subways, since 1864?—No, my opinion is always the same; I consider it very dangerous.

3304. Has it been fortified by what took place in January 1865?—Yes, certainly.

3305. When gas escapes from a pipe, does it continue in a state of gas, or does it diffuse itself into the surrounding air?——

> *Chairman.*] There can be no question about that; a very slight knowledge of chemistry assures us of that fact, that so far as it goes, it makes the air lighter, and has a tendency to go upwards.

3306. Mr. *Clerk.*] Now it has been alleged here that the mode of joining the pipes in Paris is very defective?—I am of opinion that the joints of the gas pipes are very well made; the gas companies do not lose 10 to 12 per cent. of gas by leakage.

3307. Do you know that that is not one-half of what is lost by leakage in London?—I do not know the amount of the leakage of gas pipes in London.

3308. What are the materials used for the pipes in Paris?—The pipes of Paris consist of 245,000 metres of cast iron, and 1,030,289 of bitumenized sheet iron.

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3309. How long have they been that?—The cast-iron pipes have been laid a long time, but the bitumenized iron pipes have been laid within the last twenty years.

3310. What is the mode of making the junctions between the different pipes?—The joints of the pipes are formed by placing one within the other, and surrounding them with composition which is very similar to type founding metal; I have not the exact composition because it is a secret.

3311. Is there nothing else?—A greased cord is put round it.

3312. Is gutta percha used?—The accident which occurred in 1864 arose from a joint, surrounded with a band of vulcanized india rubber.

3313. That system has been abandoned?—The company have abandoned that system.

3314. Are the pipes now laid, which you may call male and female pipes, bound round with this metal?—Yes; one pipe is forced into the other by means of a ram.

3315. Does that make an excellent joint?—The joint is excellent

3316. Have you had explosions since those joints were used?—I do not know whether those explosions have taken place since that system of jointing pipes has been adopted, but they cannot tell the cause of the explosions that have taken place in the sewers.

3317. Was it at the request of the whole neighbourhood of the Gallerie des Martyrs that the pipes were removed in 1832?—I believe so; but I do not know it. I have very little memory about that. I am not certain about it.

3318. When the water pipes are laid in the galleries in Paris is there any rule as to how many pipes there may be there?—The town of Paris placed the pipes themselves in the sewers. They have altered the joint with which they make the connections of the water pipes, because they were obliged to use fire; and they have altered it on account of the quantity of carbonic acid gas that is generated in the sewers.

3319. How are the water pipes joined?—The water pipes are joined by being brought end to end, and a ring put round them; they are then jointed with lead, and that prevents the necessity of introducing fire into the sewers; the effect of the fire would be to produce the carbonic acid gas, which they wish to avoid; the gas engineers refused to adopt the same system.

3320. Viscount *Galway*.] Why do the gas engineers refuse to use the same joints that answer for the water?—There is a double chance of leaking; the gas pipes in Paris have to be joined very much in the same manner as they are in London, and they are run in with hot lead.

Cross-Examined by Mr. *Rodwell*.

3321. Do you persist that this report of yours of the explosion of 1865 is incorrect?—There is one single mistake in it.

3322. Will you point that out?—It is here (*marking the same with a pencil*).

3323. When were you corrected upon this matter?—Immediately after the accident.

3324. Then how did Mr. Michal sign this (*producing another document*) one month afterwards confirming it?—When the report has once left my office I have nothing more to do with it; Mr. Michal has signed the report of the 25th of January, but there is a mistake in the copy.

3325. Have you ever corrected it before the present moment?—I have not corrected it.

3326. Then was that the report which was furnished to Mr. Bazalgette?—That is the report that I furnished to Mr. Bazalgette.

3327. When was that?—About the month of February.

3328. Did you ever point out to them that you were wrong at that time?—I believe not; I did not think it of sufficient importance to mention it.

3329. Is it, in your judgment, absolutely impossible to indicate the cause of the accident?—It is impossible to tell the exact cause of the accident; M. Mary fancies that it was a match thrown in; as the gas companies had prohibited the men from smoking in the subways.

3330. Was your foreman there?—The foreman was not there; he came a moment before the accident.

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3331. He was not injured ?—He was there a few moments before, and left immediately at the time of the accident.

3332. Was he examined as to the cause of the accident ?—I believe he was not examined.

3333. Was it not important to ascertain the state of the subway a few minutes before the explosion ?—It would have been of the greatest importance to obtain that information. It is known that the ventilators were open.

3334. But this foreman could have told us whether there was any smell of gas when he was in the subway ; did the foreman go into the subway ?—The foreman was not in the subway at the time, but he was outside the subway at the time they were putting down a valve at the other extremity of the subway ; they were lowering it.

3335. You had been working with a candle for a month previously ?—They were working the whole length of the gallery with candles, and piercing holes in the pipe the evening before.

3336. Have you read the report of Mr. Bramwell and Mr. Hemans, with regard to the cause of the accident ?—Yes.

3337. Do you agree with or differ from them ?—We disagree upon one very important point ; I agree with the report of those gentlemen who went over, except in one most important point. They say that the explosion took place within the pipe, and I think that it took place not only in the pipe, but also in the gallery.

> Mr. *Clerk.*] I understand the answer of the witness to be this :—We are of this accord, that we differ in one important point ; they say that the explosion took place in the pipe, whereas I contend that the explosion took place as well in the gallery as in the pipe.

3338. Mr. *Rodwell.*] Are you of opinion that it took place in the pipe ?—I am of opinion that the explosion took place in both.

3339. Can you form an opinion as to whether the explosion commenced in the pipe or in the subway ?—Some people have heard two explosions, and others say they only heard one.

3340. It is quite certain that there was an explosion in the gas pipe ?—There has been one explosion, no doubt, in the gas pipe, and an explosion in the subway.

3341. Could that explosion have happened in the pipe without the air getting into the pipe ?—There was a certain quantity of air in the pipe, because there were certain holes made. If there had been a little escape of gas, and no holes in the pipe, the gas would have formed into an explosive mixture in the pipe, but as there were a number of holes in the pipe, the gas escaped into the gallery and formed an explosive mixture. There were holes in the pipe, and an explosive mixture formed in the pipe and gallery also.

3342. *Chairman.*] And the holes through which the gas escaped allowed the atmospheric air to get in ?—Yes.

3343. Viscount *Galway.*] Was the pipe open at the other end ?—It was opened at one end only. There were holes pierced in the pipe at intervals the whole length of the pipe, and it was open at one end.

3344. Mr. *Rodwell.*] Do you really mean that there were six apertures left in the gas pipes ?—There were as many holes in the pipe as there were lamps on the bridge ; the holes were formed for the purpose of connecting the main with the lamps on the bridge.

3345. Do you call that extreme carelessness ?—I consider that they took very great care.

3346. Will you tell me whereabouts in the pipes those holes were ?—There were a certain number of holes wherever there was a gas lamp placed. The number of holes was about five or six.

> *Chairman.*] His version of that is that the valve was destroyed by the mason allowing something to fall upon it. The pipe was open at one end and cut off at the other. The valve was destroyed by the workmen allowing something to fall upon it. The gas then escaped into the pipe, went right through, and went out at the other end, and the man that was at the other end was killed. But the smell was not perceived about, as I understand

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stand him to say; therefore the mixture in that pipe was of course explosive.

3347. Mr. *Clerk.*] Where was the man killed?—One was killed at the open mouth of the pipe, and the other at the other end of the bridge.

3348. Mr. *Rodwell.*] Where were the ventilators, as you call them, of this gallery, where they at the top or at the side?—They were under the pavement.

3349. The whole of the ventilation was as you have shown it there?—At the time of the accident these ventilators were all open; the size of the ventilators when open were 80 centimetres.

3350. In reply to my friend, Mr. Clerk, you said there had been explosions on the bridges; what do you mean by that answer?—There was only one.

3351. The only explosion was the explosion on the bridge of Austerlitz?—On the bridge of Austerlitz there has been only that one explosion.

Chairman.] There were two, were there not?

3352. Mr. *Rodwell.*] The first in 1864 was not an explosion, but an escape?—Yes, it was an escape of gas, which very nearly suffocated the men.

3353. Then the only case of explosion is the one we have heard of in 1865?—There has only been one explosion, which took place on the 25th January 1865, but there have been two escapes of gas that compelled the gas companies to take up the gas pipes.

3354. And those were the two escapes which induced the gas companies to take up their pipes?—Those two escapes were the reasons why the company changed their pipes.

3355. Were those pipes jointed on the Delperdange principle?—They thought they had discovered an excellent joint, but I was of a different opinion.

3356. Do you say you were of a different opinion?—I invented an india rubber joint myself, but I never used it.

3357. Do you still think it a bad system?—I believe it is a bad joint; in fact all india-rubber joints in my opinion are bad.

3358. You say they still have pipes in the subway in the Place Napoleon?—Yes.

3359. What joints do you use in the Place Napoleon?—The ordinary joints are used there; leaden joints.

3360. You say there have been some slight explosions there?—There was an explosion in 1861, of which I received information from the company, and from my assistants.

3361. Is M. Venderé the contractor for that service?—I do not know the name of the contractor, he may be plumber to the palace.

3362. Is this correct: "M. Venderé, the contractor of this service, has owned, in spite of the restrictions which have been imposed upon him, that some of the joints opened, and that he had to moisten them to stop the escape"?—I made that report, based upon information received from my assistants.

3363. There is a difference of opinion in Paris with regard to the danger of the gas pipes in the subway?—We are all of the same opinion.

3364. How is it that these pipes are retained in the Place Napoleon?—Those are sewers which are under the control of the palace. Notwithstanding the report of the préfet and the municipal authorities they have continued the system.

3365. They have the safety of the district as much under their control as the municipal authorities have where they are?—I think so.

3366. During the whole time that they have been in that half mile under the Louvre, there has been no accident that you know of?—No; there has been only one explosion, and there was no accident arising from that explosion.

3367. Now, does the fact of its being necessary to moisten the pipes, show that they must have used bad material in the junction of the services in the Place Napoleon?—I have never been there; because it is not under my management.

3368. Have you examined the way in which the joints are made in England in our subways?—I have seen the joints that are made in London in the subways.

3369. Have you seen that the service pipes are screwed in?—Yes; I have seen that; they are screwed in in Paris the same as they are in England.

3370. Not in the service pipes in Paris?—We have two systems, one with the collar

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collar and the other with the screw. You could not continue this method if you effected the joint when the pipe was charged.

3371. When you use the sheet iron bitumenised pipe, are you not obliged to solder it?—Yes; we do solder certainly the lead pipes when they are joined with the bituminised iron pipes.

3372. How do you fasten the wrought-iron gas services to the pipes?—They are soldered.

3373. Which do you think the best system?—It all depends upon the pipe. I consider the system used for bitumenised pipes very good.

3374. In the case of the escape of gas in the Bridge of Austerlitz in 1864, had it not been left without examination for months?—People went there occasionally. With regard to the accident on the Bridge of Austerlitz in 1864, the gallery had only been recently made, and the pipes only lately been put down. With regard to the other bridges, the engineers say that the workmen enter the subways with great fear and trembling.

3375. And there are no overlookers?—There is an inspector of the workmen.

3376. Do the inspectors regularly go there?—No; I do not believe that they go regularly. I asked one of my engineers whether he would go into the sewers when the gas pipes were laid, and he said that he would go, but that he would make his will before he went.

3377. You stated that in 1864 there had been 16 explosions in sewers from escapes from gas pipes laid in the earth?—Yes.

3378. Have there been any since?—There have been three since.

Re-examined by Mr. *Clerk.*

3379. If the explosive mixture in 1865 had been in the pipe alone, would it have blown off the roof of the gallery?—I think it would be difficult to say. If the explosion had taken place in the pipe itself, it would have wanted a very violent explosion to blow off the gallery.

3880. It is possible, but not probable?—It is possible, but very improbable.

3381. Is there any body of engineers in Paris besides the engineers of the municipality?—Oh, certainly there are a great many engineers in Paris, but there are 20 engineers attached to the service of the municipality.

3382. Who placed the pipe in the Place Napoleon III.?—It was placed by the architect of the works, not by the engineer.

3383. If there were an explosion in the gallery from an escape of gas, would the company be responsible?—The company would, no doubt, contest the point. The company have always protested against the placing of the pipes there. I do not think it probable that they would be responsible.

3384. Viscount *Galway.*] Have you inspected the English subways?—Yes; I have visited them.

3385. Yesterday?—To-day.

3386. Are they not rather superior to those in Paris?—They are of different construction. They are built of bricks and ours are built of stone.

3387. Are they not in Paris, in most cases, sewers and subways combined?—It is the same thing now; the water pipes are placed in the sewers.

[The Witness withdrew.

[Adjourned to To-morrow, at Twelve o'clock.

Wednesday, 3rd July 1867.

MEMBERS PRESENT:

Mr. Bagwell.	Mr. Jackson.
Mr. Duff.	Mr. Cornwall Legh.
Viscount Galway.	Mr. Paull.
Mr. Grove.	Mr. Tite.

WILLIAM TITE, Esq., IN THE CHAIR.

John Frederic Bateman, Esq., called; Examined by Mr. *Burke*.

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3388. WE know that you are a Civil Engineer, and have had a great deal to do with waterworks particularly, have not you?—Yes.

3389. I believe you constructed the great waterworks at Manchester?—I did.

3390. And which are now under the control of the Corporation of Manchester?—Yes.

3391. You also constructed still larger works at Glasgow, did not you?—I did.

3392. They are under the control of the Corporation of Glasgow, are they not?—Yes.

3393. More than that, I believe you have been consulted in reference to a vast number of waterworks and undertakings existing in the United Kingdom?—I have constructed waterworks to supply about two millions of people, in round numbers.

3394. Lately you have been called in consultation as to the waterworks in Dublin, if I mistake not?—Yes.

3395. Have you given your attention to the subject matter of the Bill now before the Committee?—I have.

3396. Have you inspected the existing subways belonging to the Board of Works?—I accompanied a Committee of this House in their inspection of the subways, three or four years ago, when the inquiry was before them.

3397. *Chairman*.] In 1864?—Yes.

3398. Mr. *Burke*.] Have you formed any opinion as to the expediency of laying down water pipes in subways, and gas pipes also?—Yes; more particularly with reference to water pipes; I do not profess to have any greater knowledge of gas pipes than that which most gentlemen possess; but as to water pipes, I have more especially considered the subject.

3399. What is your view with reference to the expediency of adopting the subway system as a means of conveying water mains?—I think they would be much more inconvenient to the parties who have to lay down water pipes, and they would be much more costly, and I see no advantage to be gained by the adoption of subways, as regards the laying of water pipes, in the interests of the parties to whom the water pipes belong.

3400. You admit the fact, of course, that it would avoid to a certain extent the breaking up of the roads for the purpose of laying those pipes, and relaying them from time to time?—It would, certainly.

3401. It would have that advantage?—Yes.

3402. Do you think that that advantage would countervail the disadvantages which would attend the adoption of that system of laying mains and water pipes?

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pipes?—That is a question rather apart from the simple question of laying water pipes. If the public for other reasons chose to make subways, then perhaps it might be for the interest of the public that the water pipes should be laid within the subway; but, of course, the laying of the water pipes into the subways would be more costly than laying them in the streets, and it would entail many difficulties in the way of arrangement in that confined space that would not belong to the laying of water pipes in wider spaces.

3403. Their being laid in a confined space in proximity to other pipes and services, leading from one to the other, do you believe that would obstruct, from time to time, the alteration and removal of the pipes and the substitution of others?—It would, undoubtedly.

3404. And tend to additional expense?—It would increase the expense of the laying of the water pipes, and it would increase the difficulties attending the laying of them.

3405. Let us take into consideration the question of laying gas pipes also; in your judgment would that be attended with danger or not?—I think there can be no doubt about its being attended with danger. Shortly after the pipes were laid in Glasgow, after the introduction of the Lock Katrine water, or about that time, the pipes were being laid, the gas escaped through the earth from a pipe near a vault, in which one of our large valves was fixed, and upon the workmen going to it the gas ignited, blew up the vault, and killed one man and seriously injured another.

3406. Whenever gas can escape in a confined space and mix with the atmospheric air, there must of necessity be a danger of explosions, must there not?—There must of necessity.

3407. The explosive character of the gas so mixed with the atmospheric air is such as to be practically even far more powerful than gunpowder, is it not?—Yes.

3408. Is it your opinion that if gas pipes were laid in a subway, there would always be, at all events, the risk of an explosion taking place?—I think that must follow as a matter of necessity. The gas now escapes to a considerable extent from the pipes into the earth, and no gas pipe is ever taken up without finding the whole of the soil surrounding it dyed black and permeated by gas; and if the pipes were laid in a subway, where it would not have the difficulty when escaping of passing through the earth, the gas would more easily escape and lodge in those parts of the subway in which there might not be ventilation. My belief is, that there are no arrangements for sufficient ventilation in the subways that I have seen.

3409. Practically the fact of the permeation of the gas when it does escape through the soil, itself is a protection, *pro tanto*, to the public against explosion?—It must retard the free escape, and to that extent it would be a protection.

3410. We all know that the escape of gas is capable of being detected by the smell?—Yes.

3411. Supposing an escape of gas to take place in a subway, do you believe the spot from which it escaped would be readily ascertainable?—By a person within the subway, do you mean?

3412. Yes?—No; not very readily, because the whole of the air being permeated by the gas, it would smell in one part almost as badly as in another after a short time.

3413. Supposing a considerable escape of gas should take place in a subway, would it be dangerous for any person to approach it with a light?—That would undoubtedly be the case if the mixture was of an explosive character.

3414-5. So that at all events, in order to ascertain an escape of gas, people would have to go and grope their way in the dark, would they not?—

Chairman.] Could not they take a safety lamp?—

They might take a safety lamp, inasmuch as they would in a coal mine work with safety lamps in an explosive gas,

3416. Mr. *Burke.*] It has been broached here, that if an escape of gas were to take place, and there was an opening at the top of the subway, the gas would pass through the surrounding atmosphere and escape through the aperture; is it your opinion that it would do so, or would it not mix itself with the atmosphere?—In the open air do you mean?

3417. In a subway?—In a subway the gas would mix with the surrounding atmosphere within the subway.

3418. In your judgment is it not a total fallacy to assume that in the event of an escape of gas taking place in a subway, the gas would not mix itself with the atmosphere in the subway, but would find its vent at the aperture left in the crown of the arch?—

Mr. *Cripps.*] Mr. Bateman is not a gas engineer.

Mr. *Burke.*] Mr. Bateman is a scientific man.

Witness.] I do not think it requires any particular knowledge of gas engineering to be able to answer that question; we all know that one gas will permeate another; you can tell by the smell in a room in which gas has escaped that the whole atmosphere of that room, or any confined space has gas in it, because it smells of gas, and therefore gas must have permeated the whole body of air.

3419. If there was an escape of gas in this room, and one of the windows was open at the top, do you suppose that the gas would rush out of the window and leave the atmosphere pure?—Certainly not.

3420. It would mix with the surrounding atmosphere, and make it the explosive mixture which is so much to be dreaded?—No doubt of it.

3421. It is the admixture of gas with the surrounding air that in many cases has occasioned explosions?—The mixture of gas and air in certain proportions.

3422. Have you seen any system of ventilation adopted in connection with these subways which, in your judgment would prevent that admixture?—The ventilation which I saw when I passed through the two subways which have been alluded to, in 1864, certainly was not sufficient to carry away any noxious vapours which might arise in the subways.

3423. Taking things as they are, or as they were when you saw them, the result would be that, if an escape of gas took place, it would form an explosive mixture?—Yes; in fact there was no ventilation to carry away any gas whatever out of the subways, on the occasions on which I was present.

3424. *Chairman.*] They were sewers, were not they, you mentioned, not subways; did not you explain that as being in a sewer?—If I said "sewers" I meant to say "subways"; but there were certain openings in the roof of the subways, and in every case there was a down draught from those openings from the street into the subway.

3425. Are you speaking of where an explosion actually took place?—No; I am speaking of the Garrick-street subway and the subway in Southwark-street.

3426. I understood you to speak of an actual explosion which you knew of in a sewer, is that so?—No.

Mr. *Burke.*] There is no question upon the notes about an explosion having taken place in a sewer.

3427-8. Yes; there was an explosion in a sewer by gas escaping from one of the pipes and getting into the sewer?—That is not what I stated; I stated that in a vault in which one of the large valves belonging to the Glasgow Waterworks was inserted, the gas exploded, having escaped from some adjacent pipe, and it blew off the roof of the vault, and killed one man and seriously injured another.

Chairman.] That is what I referred to.

3429. Viscount *Galway.*] What was the size of that vault?—I should think about something like six feet high by eight feet square.

3430. Mr. *Burke.*] We have been told here that there are certain apertures in the roof of the archway of the subway in Garrick-street, I think two feet square, or something of that sort, for the purpose of ventilation; in your judgment, would they afford adequate ventilation for the prevention of such accidents as might arise from the admixture of an escape of gas with the surrounding atmosphere?—Certainly not; and the proof of that is, that when I was there with the Committee, the draught was from the outer air into the subway; there was no escape of air apparently; of course the air drawn in must have escaped somewhere, but as far

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as any current of air could be detected by a candle, the draught was wholly from the outside into the inside.

3431. Other theories have been broached here; one was that the gas would pass right through the air, and being lighter than the atmosphere would go out of the apertures; and the next was, that being lighter than the atmosphere, being mixed with it, that the lighter mixture would find its way out, what do you think of that?—The lighter gas would gradually find its way to the upper part of the subway.

3432. But supposing there was an admixture of the two, and that consequently the whole admixture was lighter than the surrounding atmosphere outside, do you believe that there would be such a vent for that admixture out of these apertures as would relieve the subways from the explosive mixture?—Not unless there were a means of supplying air from below to compensate for that which might be expected to issue from above.

3433. Have you given at all your attention to this; we will assume for a moment that, with great diligence and care, explosions might be prevented for a course of years; but supposing one did occur, what would be the result of such an explosion in a subway?—I cannot say: it would be very serious, according to the amount of gas that might be evolved.

3434. Might it not have the effect possibly of destroying the whole street?—Yes; if there was a very considerable amount of gas escaping.

3435. Do you see any justification for incurring such a risk?—Do you mean justification for the introduction of gas pipes?

3436. I mean is there anything in those subways in the shape of advantages apart from the laying of pipes, or preventing the breaking up of the streets, which would justify such a city as London incurring such a risk as would be involved in an explosion?—I think not.

3437. If an explosion were to take place, such explosion of course would break not only the gas pipes, but also the water pipes?—It would in all probability.

3438. Would that alone lead to serious damage resulting from such an occurrence?—I can hardly estimate the amount of damage which would be caused by a large pipe bursting in a subway; it would be a very serious thing indeed; as serious in another way as an explosion of gas, almost.

3439. We will assume that Parliament should think fit to force these pipes into the subways; if that were to be so the subways will always be under the control of the Board of Works, or ought to be?—I should presume they ought to be.

3440. And if under their control, should they not be responsible for anything that occurs there?—Naturally, they should.

3441. And being under their control and management exclusively, if they force the pipes to be laid there, they should be responsible, should they not?—Yes, in my opinion.

Mr. *Cripps.*] As a water engineer?——

3442-3. Mr. *Burke.*] As a man of great experience in dealing with these matters. Now, having dealt with the ventilation, have you considered how those pipes should be laid in cross streets; for instance, large pipes?—There would be great difficulty attending either the laying of gas or water pipes, or both. I do not mean to say that they are difficulties which might not be overcome, but they would offer considerable impediment to the flow of the water, and would add to the cost and to the intricacy of the arrangements.

3444. We have been told here that probaby there might be a tramway down the middle for the purpose of carrying to and fro the enormous pipes that would have to be taken in. I suppose it would be absolutely necessary that some means should be provided for the convenient passage of those pipes?—Yes; the large pipes are of a great weight, and they would be very difficult, except by such means, to convey in a small subway.

3445. Very difficult indeed?—Yes.

3446. Looking to the intricacy of those numerous pipes that might be there, and the services and the connections being made in cross streets, do you see how such a tramway could be usefully erected?—I think that such a tramway might be usefully erected at such points, or between those points, at which the interruption to the tramway must necessarily take place by carrying pipes across, and therefore, although they might not afford all the accommodation which would be desirable

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desirable, or which can be attained on the surface of the street, they might do something towards mitigating the evils.

3447. On the surface of the street you have the whole width of the surface to work in, and, practically, there is no sort of difficulty in laying down pipes of a very large character, is there?—No; if you compare the two modes of laying the pipes, the one in the street with an open trench, and the other in a subway; the pipes in the open trench are brought by carts or waggons to the spot at which they are required, and deposited by the side of the trench, and are then rolled conveniently and easily over the trench, and dropped down by proper tackle to the spot at which they are required, all in the open air. Everybody can see what they are about; there is no impediment, either laterally or vertically, and, therefore, the cost of handling is as small as it can be. If you have to lay a pipe in a subway, that subway being arched over, you must take all the pipes to the openings, which are left for the purpose of having the pipes introduced; they must be put end on or slanting, or in some way or other in a slanting direction, and then they would have to be conveyed by the tramway, or other means, to the spot at which they had to be placed, and then be put in in the best way they could be in the confined position, the cost of handling being, probably, twice as much as it would be in the other case.

3448. Just so; again, in laying gas pipes out of doors, they have the most perfect means of ascertaining whether the joints are perfect, have they not?—Yes.

3449. And working in the open air you can apply fire, and ascertain exactly what the fitting of all the joints is?—Yes, there being no difference, as far as the pipe is concerned, between the gas and water, whatever objection there is to the one would apply to the other, or whatever facility attaches to the laying of water pipes in the open air, of course attaches to gas pipes.

3450. Are you aware that under the General Act, gas and water pipes are required to be laid at a certain distance apart from each other in the open ground, to prevent contamination?—Of course the necessity for that results from the intermittent supply of water.

3451. *Chairman.*] Why?—Because the pipes are sometimes empty and sometimes full, and while the pipes are empty the gas might insinuate itself.

3452. "Might insinuate itself?"—Yes, and does occasionally.

3453. Mr. *Burke.*] At all events in laying gas and water pipes in the open air, they have every facility, have they not, for laying them with economy, and so as to prevent any accidents arising?—Yes, that is so.

3454. And if they were laying pipes of a very heavy character or calibre in a subway, encumbered with many other pipes and services, might there not be the danger, in dealing with them, of the fracture of other pipes?—There might be that, but probably there is more difficulty in making good joints in so confined a situation.

3455. You have had, I know, in your practice occasion to deal with vast bodies of workmen?—I have.

3456. Have you found in your experience that you cannot always rely upon the accuracy of the workman, and the care with which he conducts his operations?—Yes; that is undoubtedly the case.

3457. In the event of negligence occurring in these works, such negligence might lead to an enormous amount of injury, might it not?—There is no doubt it might; the jointing upon which the tightness of the water pipe, or the tightness of the gas pipe, mainly depend, is much better overlooked in an open than in a confined space like a subway; in fact it could not be properly overlooked in a subway; it would depend almost entirely upon the care of the workmen themselves.

3458. Those workmen working in comparative darkness, as compared with the open air working in comparative darkness in a confined space, encumbered with other pipes, instead of having an open space without any encumbrance?—Yes; that would be so.

3459. We have had evidence here of what is done in Paris, and about what is not permitted to be done there; have you had experience of any other European city in which subways have been sought to be adopted?—I have; I walked through the subways in Madrid, in which water pipes have been introduced.

3460. Is the City of Madrid lighted with gas?—I think so.

3461. Do

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3461. Do the authorities of Madrid permit the gas pipes to be laid in their subways?—There are no gas pipes in the subways.

3462. You found water pipes there, I think you said?—Yes; the subways in Madrid were made expressly for water pipes.

3463. But you found no gas pipes there?—No.

3464. The gas pipes, I assume, are laid in the same way as they are in London and in Paris?—They are; they are laid in the street.

3465. You are not connected with any gas company, are you?—No; I am not.

3466. And you give this evidence simply from your experience as an engineer dealing with a subject which properly comes within the cognisance of any engineer acquainted with the laying of pipes?—Yes.

Cross-examined by Mr. *Cripps.*

3467. With regard to Madrid, I suppose your object in going down the subways there, was rather to see how the water pipes were laid there?—I was going over the Madrid Waterworks, and I found that they were very perfect works in every way; I was taken by the engineer through nearly the whole of their subways.

3468. Was the subway there a small one made for the purpose of water only?—Made for the purpose of water only.

3469. *Chairman.*] Of what size?—I cannot give you quite the dimensions, but I should think it was about 7 feet high, by 6 or 7 feet wide.

3470. Mr. *Cripps.*] How long, to your knowledge, have the water pipes been laid in the subways in Madrid?—Since the introduction of the water there from the Guadarama Mountains; I have known the Madrid Waterworks for five or six years, and I should think they have been in operation about eight or 10 years.

3471. You think that for eight or 10 years the water pipes in Madrid have been laid in the subways?—Certain of them; the large mains which conduct the water to the centre of the city is so laid, but not the distributing pipes.

3472. You mean that there is no open connection between the subway and the houses?—No.

3473. How are the service pipes laid to the houses?—In the streets; the large main pipes only are laid in the subways.

3474. So that they have partially adopted the plan which we propose to adopt here?—I do not know what their reason was, except that, as regards subways, some years ago it was a favourite notion that they would be an improvement, and they laid their pipes in the subways under the idea that it would be an advantage, but they are the first waterworks that have been introduced in Spain, and I very much doubt whether their example will be followed, in fact, I am sure it will not.

3475. Mr. *Jackson.*] What are the dimensions of the present subways there?—If I recollect correctly, they are about 7 feet 6 inches high, and about the same width; there is one large pipe of about 30 or 36 inches in diameter laid in the subway.

3476. Mr. *Paull.*] In the centre or on one side?—On one side.

3477. Mr. *Jackson.*] In which street do they go?—They go from near the reservoir, which is about two miles out of Madrid, down the main street to the Puerta del Sol, which is the centre of Madrid.

3478. Mr. *Cripps.*] I take it that the traffic over the streets in Madrid, is nothing at all like the traffic over the streets in London?—Nothing at all.

3479. But still there they have subways?—They have through some of the streets for certain sizes of pipes, for large pipes.

3480. Now with regard to laying pipes, which is a point you speak of within your own knowledge, of course there what is applicable to water is applicable to gas, as far as the relative difficulties of laying them in the subways and in the streets are concerned?—Just the same.

3481. Should you not consider it an advantage *cœteris paribus* of course, that the workmen could be inspected, and that their work when finished, could be seen as soon as it was finished, to ascertain whether it was perfect or not?—Yes; if the workmen can be inspected, and their work tested.

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3482. And their work seen immediately after it is done?—Yes; but it is the case in the open street when it is done.

3483. That is what I am coming to, at any rate that would be an advantage; now, in the open street is it not always an object in order to prevent the stopping of the traffic, to get the work done as soon as possible?—It is desirable to expedite the work as much as possible, but in no case is it desirable to hurry it forward in such a way as to prevent proper inspection.

3484. No doubt it is never desirable to do that, but what I ask you is this, from the fact of there being a pressure always to get the street in a state to accommodate the traffic again, is it not always done as soon as it possibly can be?—Yes; consistently with proper workmanship; in my own practice I never allow that consideration to prevent proper inspection.

3485. It is so much an object that the work is continually done at night, as well as by day, is not it; particularly in London you must have observed that going on?—I cannot speak as to London; occasionally that may be so, but certainly, not as a general rule; pipes are not generally laid at night.

3486. They are frequently laid at night?—I should not say frequently; occasionally I will admit, but, as a rule, pipe laying is not done at night.

3487. May I take it for granted that the object of laying them at night is, that the interference with the traffic shall be got over as soon as possible?—No doubt.

3488. The moment the work is done, that is as soon as the pipe is joined, the earth is rammed down?—As soon as it is properly inspected.

3489. You do not leave it open for a day or an hour that you can avoid, but when the work is done, you fill in your trench at once, so as to restore the road for the traffic?—Yes; but then you must remember that water is its own best inspector, and that a bad joint under pressure, will very soon tell for itself.

3490. But, at any rate, the custom is to fill up as soon as done?—As soon as is consistent with good workmanship. But do not overlook the observation which I made. The joint of a water pipe under pressure, if it is defective, will immediately show a leakage by damping the surface; or if it is sufficiently great, by rising above the surface, so that you can immediately detect a bad joint in a water pipe.

3491. But I am applying my question to gas and water too, when I say that it is the fact, that directly the workman has finished, from the exigencies of the case, the earth is pressed down, and there is no further opportunity of inspecting it, nor is it even inspected, unless some accident has arisen to those pipes?—Not as respects even the gas or the water, I should suppose.

3492. That is to say, an accident must actually have happened, and it must actually have come to such a point as to give notice to people on the surface, before you think of looking at that pipe again?—In water it would not be an accident.

3493. When I say "accident," I mean anything that has disturbed the pipes?—That is shown directly by the water, or nearly so, in all cases.

3494. Whether in gas or water, but in gas more particularly, it would depend upon the amount of damage to the pipe, or the amount of fracture, how soon that damage would be detected, would it not?—No; not with water. If you have a leaky joint with water, the water takes the line of least resistance; it rises up to the surface and shows a wet place, or a damp place on the surface, which may only be an indication that there is a leakage below; there may be no damage whatever.

3495. That is to say, as soon as sufficient water has exuded to come to the surface?—That would be directly, if it is a leakage of sufficient importance.

3496. You say that is detected very speedily with water?—Yes.

3497. But in the case of gas it may be some considerable time before that is found out?—No doubt.

3498. The gas in the meantime may be permeating the soil laterally or downwards, or in some other direction than the level of the street?—No doubt.

3499. And damage may be going on, or a leakage may be going on, which there is no opportunity for the passers by to ascertain?—That may be so.

3500. We know, of course, that an escape of gas is dangerous anywhere, and must be dealt with as a dangerous matter; would it not be desirable always, in the

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the case of an article like gas, to have the means of detecting an escape immediately an escape takes place?—Yes; if you can do so without incurring, for the purpose of inspection, a greater risk than by leaving it alone.

3501. But it would be an advantage, with a dangerous matter of that kind, to detect the leakage instantly, or as soon as possible?—Yes; if you do not incur another danger by obtaining the means of inspection.

3502. Now you have just very fairly stated, that under the present means of inspection you have not the means, with gas, of detecting an escape, frequently, till it has permeated the soil, and gone somewhere else?—That must undoubtedly be so.

3503. Then the means of detecting an escape of gas if the pipes were in a subway, would be entirely a question of the proper inspection of that subway, would it not?—I do not know; I think it is a dangerous experiment.

3504. You think it is a dangerous experiment; I am dealing with a matter which is dangerous anyhow, more or less; but it would be desirable, if you could by proper inspection have it, to have the means of detecting any escape of gas the moment the leakage commences?—If I must give you my own view upon the matter, I would far rather trust to my own nose in the street than I would to an examination by a candle in a subway.

3505. You mean as far as you personally are concerned?—Either personally, or as regards any other person. I would rather trust any friend of mine to detect an escape of gas by his nose in the street than I would have him go with a light, which he must apply to the joints of the pipes in a subway charged with an explosive mixture.

3506. As regards the public in the streets, you tell us that they can, and would detect an escape instantly in the one case, but in the other it may go on for a long time?—I think that is entirely a fallacy. If you will just consider for a moment, you may have a number of joints from which gas may be escaping in a subway, none of them very large in amount, but together forming a considerable escape, how are you to tell from which joint an escape is taking place, except by applying a light to ascertain where it is escaping?

3507. Your nose in a subway, I apprehend, would tell you at once that there was some escape going on?—Your nose would get so highly charged with gas, that the whole air would smell as bad as the gas itself, and you might go smelling from joint to joint, and I will be bound to say that you would not smell the joint much stronger than the air which you were breathing.

3508. If there was an escape in a subway, you would not smell it at any rate with any strength at all when you had got past the ventilation hole from the point where the escape had been?—I cannot tell you that, except with a proviso that is provided you had proper ventilation. If you had proper ventilation, you could tell on which side of the particular spot the escape was taking place; that is all you could do.

3509. Therefore, at any rate, the ventilating holes would localise the escape to a person examining it, and would show that it was between two particular vent holes?—If you mean the ventilating holes as they now exist, they are no ventilation at all.

3510. You are going to a different point. First of all, let us assume the ventilating holes to be as you please, more or less, we will come to that presently?—Then I would destroy all the holes. I would have no holes at all, and, therefore, I should not be able to detect it in the manner you are suggesting. In order to produce perfect ventilation, you must have no holes in the streets; you must have a constant current in one direction.

3511. I assume that there are ventilating apertures?—The ventilating apertures, as they now exist, do not and cannot ventilate the subway.

3512. Whether there is, under the existing system, sufficient ventilation is one thing?—They cannot and will not ventilate them at all. I would venture to say that the holes in the subways will not ventilate those subways at all.

3513. I said before, you do not think the holes sufficient. Now, let us pass from the point of the existing holes, and let us assume that these are ventilating holes, what I want to ask you is this, whether those ventilating holes would not localise the escape as between any two supposing there to be ventilation?—I am supposing this gratuitously, because I do not believe it. But supposing there was an outer draft into the open air through those holes, you might detect

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whether there was an escape near any one of them. There is, however, not a draft into the open air, the draft is from the open air into the subway.

3514. That is another question. I will grant you, if you please, that with proper ventilating holes there would be facility?—I do not admit that a hole can be a proper ventilation at all. I am sure it cannot. In order to get ventilation, you must have (as in a coal mine) a current of air constantly passing in one direction; you can only get that in this case, by having the means of creating a draft at one end, which must be by a furnace, or by some means for driving it; either drawing it out by mechanical means, or by a furnace; creating a draft by a fire or a furnace, and so drawing the air out, and then you cannot apply your nose to it.

3515. Let us assume all that; let us assume that there was what may be in your opinion, or in the opinion of others, a proper ventilation established, then you tell me you can localise the spot at which the gas escapes?—No; I do not say so; indeed, that is the whole difference between your question and my answer. To have a proper ventilation, you must stop up all those holes which are now disturbing ventilation, and destroying ventilation; and therefore you can have no place at which you can apply a nose for localising the escape of gas; any gentleman who knows anything of coal mining and the ventilation there, which bears the closest analogy you can have to subways, will know that you must have a current always going in one direction, and if you disturb what is called the brattice or the channel by which the air is conveyed in that one direction, you destroy the ventilation; ventilation does not any longer go on. You must have this constant current, and you can only obtain that by having all these holes made up which would disturb the ventilation caused by a current created at one end by a furnace, or by some other means; and therefore you would destroy in that way those ventilating holes which you rely upon for detecting an escape of gas.

3516. Your objection then to these subways is, that they are not properly ventilated?—They are not properly ventilated.

3517. Now, about proper ventilation, you went down into the subways upon one occasion?—Yes.

3518. Upon that occasion you found a draught coming down into the subway, from an opening?—From all the openings.

3519. Where did you suppose that went to?—I do not know; I merely state the fact.

3520. Surely if the draught went in there, it must have got out somewhere else?—I suppose it was getting into the sewers below, or escaping at some one of the holes which I was not applying a light to.

3521. But whenever it went out, if that draught was coming in at one hole, it was going out somewhere else?—Whatever air is admitted, of course an equal quantity must be discharged.

3522. You found it coming in sharp at this place?—Not sharp, there was a down draught.

3523. *Chairman.*] In which street?—In both subways.

3524. When was that?—In 1864.

3525. Mr. *Cripps.*] That was the only occasion on which you went down, you told me?—It was.

3526. *Chairman.*] What time of the year was it?—I went down with the Committee in May 1864, I think.

3527. Mr. *Cripps.*] You did not take occasion to discover where the air was going out?—No.

3528. Of course you do know from your experience that it must have gone out somewhere, that is to say, it was passing through the subway in a state of motion?—The motion could not be detected by a light; there was no current to move a candle.

3529. *Chairman.*] There was a current inwards?—Yes; only at the holes, only at the openings; but in the general body of the subway there was no apparent current.

3530. Mr. *Jackson.*] There must have been a current; there must have been a change of air; if it got in it must have got out?—Yes; no doubt.

3531. *Chairman.*] If it came in at one end it must have got out at the other?—No doubt.

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3532. Mr. *Cripps*.] I apprehend that the aperture you were near was the descending current?—In every case it was descending.

3533. *Chairman*.] Was that at one end or throughout the whole subway?—Throughout the whole.

3534. Throughout a mile?—Throughout the whole length of the subway.

3535. It is nearly a mile long?—Yes; if it is so long.

3536. Do you mean to say that you tried every one of those holes?—I am not sure that I tried every one, but I believe I did, because my attention was specially directed to it; I am sure that I tried every one in Garrick-street.

3537. Mr. *Cripps*.] If the air was coming in, however slightly, at all the holes you tried, it must have been going out very considerably at some one you did not try?—Very likely; but I only tell you what the state of things was.

3538. Viscount *Galway*.] In the Garrick-street subway did you try the outlet at the south-west end of the subway?—I am sure I forget now, but I tried all the outlets in the Garrick-street subway.

3539 Did you try the one at the south-west end, where there is a large pipe?—I believe so; there may have been some alteration since I was there; in 1864 it was that I was there.

3540. I mean the other day?—I was not there.

3541. Mr. *Jackson*.] Whether there is an up current or a down current, there being a current there must have been a change of atmosphere?—Yes; no doubt.

3542. Mr. *Cripps*.] I understand that since 1864 you have not been down in the subway?—I have not.

3543. Mr. *Cornwall Legh*.] In your knowledge of gas, is there any other means of ascertaining a slight leakage besides putting a lighted candle to the pipe?—I will not answer that; but I should suppose there hardly was; you may probably ascertain a strong leakage, but I think you could only ascertain a slight leakage by seeing whether it ignites or not.

3544. Mr. *Cripps*.] Do you know whether an escape of gas discolours the paint upon the pipe?—I do not know; it may do so.

3545. Do you know of Ansell's apparatus for the detection of gas in mines?—No; I do not.

3546. Of your own knowledge, you know of no other way than putting a candle to the pipe?—To my knowledge, I do not.

Chairman.] Mr. Bateman said he was not a gas engineer.

3547. Mr. *Cripps*.] My learned friend having called him a water engineer examined him altogether about gas; now, let us get to water. First of all, I understand you that as regards the public, you admit there would be an advantage in not breaking up the streets?—No doubt.

3548. But it would be a disadvantage you say to the water company from the increased cost?—From increased cost, and from increased inconvenience.

3549. First of all, you speak of the expense of laying in the first instance and the removal, do you know how that is provided for by the Bill?—At the cost of the companies, I believe, the removal would be a very serious matter, and many of the small pipes would not pay for removing.

3550. If you have not considered it before, I will not pursue it. You do not know the provisions of the Bill?—I do not remember them.

3551. Do you know the provisions of the Bill for payment; how the pipes are to be paid for, if at all, when they are down there?—I do not remember it precisely; but my impression is that the water companies are to contribute towards the cost of the subways.

3552. Is that your impression?—Yes.

3553. Whether it is any advantage to them, or not?—Yes.

3554. If it is any advantage to them, you would think it fair, would you not, that they should contribute towards the cost of the subway?—Yes; if it were an advantage.

3555. How could you properly ascertain in any other way whether it was an advantage to them than by referring the question to a competent arbitrator?—I consider myself a competent arbitrator; I have laid more miles of pipes, probably, than any man in the kingdom, and I know exactly what it will cost.

3556. You, as a water engineer, would hardly consider yourself a fair tribunal to decide between the two parties?—Perfectly; it would not make the slightest difference whether I was a water engineer or not.

3557. Can you suggest anything fairer; is that the only suggestion you can make, to refer the question to yourself?—No; I do not say that; you are testing the value of my opinion.

3558. No, not at all; can you suggest anything fairer than to refer it to an arbitrator who can go most fully and thoroughly into the matter?—In case of dispute as to whether it was an advantage or not, that is the only way to ascertain it.

3559. Whether it was more convenient or inconvenient to have them there, would be part of that question, would not it, in considering whether they were to pay for them?—I do not know, you will not let me look at the Bill, and I cannot tell what the Bill provides for.

3560. I am merely upon a matter of principle, supposing we had no Bill at all, I ask what in your opinion would be fair?—The question of convenience ought to be taken into account.

3561. The question of convenience or inconvenience is, in point of fact, a question of payment or non-payment, or the amount of payment?—It ought to be.

3562. Therefore it might fairly be a question for the same arbitrator?—Certainly.

Re-examined by Mr. *Burke.*

3563. If the companies were to pay for an advantage, they should be paid if there was a disadvantage, should not they?—Yes; if the thing is to be fairly treated.

3564. To make it fair the Bill should have provided, should it not, that if it should appear to the arbitrator that the companies got an advantage in the saving in money, they might pay the Board of Works the extent of that saving of money; but if, on the contrary, it was proved to the arbitrator that the companies lose money, then the Board of Works should pay them the loss, should they not?—Clearly; because the only object, as I understand, of introducing subways is to prevent the inconvenience to the public of breaking up the streets; that may be a question of sufficient importance to entitle the Metropolitan Board of Works to call upon the public for a heavy contribution; but whatever cost is incurred by private parties or companies ought to be paid for by the public.

3565. So that, to make the Bill fair, as my learned friend has drawn your attention to the fairness of some of the provisions, it should distinctly provide, should it not, that if the companies were put to loss and inconvenience by being compelled to go into the subways, they should be paid by the public for that?—Upon principle that certainly ought to be so.

3566. These arbitrations are rather costly matters, are they not?—Frequently they are.

3567. If a company on every occasion of altering a pipe are obliged to go to arbitration, that is not a very convenient thing, is it?——

Mr. *Cripps.*] What do you mean?

3568. Mr. *Burke.*] I mean that if on every occasion when they were coming to do any work in a subway, you had the power of calling upon them to pay unless the arbitrator should say they ought not to pay, they must go to the arbitrator to ascertain whether they are to pay or not?—If every time they touch a subway they have to go to arbitration it would be a most intolerable nuisance and hardship.

3569. Now, just going back to other matters, you told us that there was a very close analogy between a subway and a mine, which there probably is; mines are always required to be ventilated by a current of air, are they not?—Yes; they can only be ventilated by a current of air.

3570. So that adopting that analogy, do you see any reason why less precaution should be taken in a subway, surrounded as it is by valuable property, than in the case of a mine?—It ought, in my opinion, to be treated in the same way; it is a mine, in fact.

3571. Further also, we know that although mines are dealt with with great precaution,

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precaution, and that there is ventilation, and they require the use of safety lamps, explosions of a serious nature do occur there, do not they?—They do.

3572. So that there is evidence that even with every precaution of ventilation, and every regulation adopting safety lamps and so on, still, from other causes, explosions take place in mines?—Yes.

3573. If there be so much analogy between the two, would there not be equal risk of explosion in a subway?—Without proper ventilation there would be.

3574. And even with proper ventilation?—Yes.

3575. My learned friend wanted to get from you, that if the air came down from holes at the top it must have got out again somewhere; so far as you examined, it was coming down?—If air comes down one part an equal quantity of air must go up another, that is a matter which occurs in any subway, and yet there might be no proper ventilation.

3576. Was there a sewer in the subway?—There was one below; that sewer was supposed to be trapped, but there are no traps which will prevent air passing through altogether.

3577. It might happen that, adopting the principle that air coming in would go out again, there was a vent for it through the sewer?—It is quite possible.

3578. As far as your experience goes, you are quite certain that the air came down those holes?—It did on the occasion I was there.

3579. As regards an escape of gas, I believe, in houses the universal mode to ascertain whether a joint is defective, is by applying a light to see whether there is an escape from it?—Yes.

3580. That is the universal mode outside, where there is obviously no great escape going on, and no great danger incurred from it; so that when a smell of gas arises in a house, you set open all the windows, and apply a light to the joint to see where the escape occurs?—Yes; that is the usual way.

3581. My learned friend has asked you whether that might not be avoided by the adoption of some particular paint at the joint——

Mr. *Cripps.*] I did not ask that; I asked whether there were not other modes besides applying a light.

3582. Mr. *Burke.*] Gas discolouring the paint, I suppose, if that mode was found efficient, it might have been adopted heretofore in houses and sitting rooms, as well as down in the sewers?—It might not be necessary in a house, but it might be necessary to adopt that precaution in a subway.

3583. And in a subway, in order to ascertain whether the paint was discoloured, you would require a pretty good light to see whether it was or not, and you ought to have the means of examining the joints all round the pipe, ought not you?—Yes.

Chairman.] It turns it black at once.

3584. Mr. *Burke.*] My learned friend asked you whether you had the means at present of ascertaining in all cases whether there was a leakage going on or not; in the case of leakage going on creating a smell, you do find it out immediately do not you?—Yes, you perceive the smell; and then you may search for the spot where the leakage might be found.

3585. Is it not the universal practice in London where an escape takes place, that the fitter is sent for to remedy it, and if an escape takes place in the street, the inspector is sent for and he seeks it out at once?—I presume that is the case.

3586. But if it is not sensible to the nose then practically it is not finding its way into the atmosphere at all, so as to be capable of explosion?—No.

3587. So that there is always that security above board, that if an escape of gas is sensible to the nose you have an easy mode of detecting it and remedying it, and if it is not sensible to the nose, there can be no danger arising from the escape?—That is so.

3588. In Madrid I understand you to state that the supply of water is a new introduction of the last few years, and that the subways were made mainly for the convenience of laying water pipes in them?—That is so; the water pipes there are the property of the municipality, it is not a company, and the municipality

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municipality, therefore, was at the cost both of the subway and of the water pipes.

3589. And that subway was as you state, 7 feet high?—I think it was something like that.

3590. That is the size, is it not, of the subways of the Board of Works, or is it higher?—I think they are rather higher than that; I know that I am 6 feet high, and I walked down the subway with ease, and there was a space above my head, so that I should suppose they are about 7 feet high.

3591. Was there plenty of room to have laid gas pipes in those subways in Madrid?—It would have been difficult to lay a second pipe of the same size as the first.

3592. I understand you to state, that even there there were no galleries as proposed here for the admission of services?—None; where they had occasion to take a small branch pipe off, the pipe rose perpendicularly from the main pipe which is an objectionable mode of doing it, but which is necessary in a confined subway; it branched off to the side streets, at the ordinary depth which would be 3 or 4 feet below the surface.

3593. Were there separate service mains laid in the streets?—Yes.

3594. In the ordinary way?—Yes.

3595. *Chairman.*] In the main street, the street you described, the great street coming down from the reservoir to the Puerta del Sol?—There was a subway in the great street coming down to the Puerta del Sol, with branches extending in various directions.

3596. How did they manage to supply the houses in that main street going down?—From service pipes lying in the ground; the great mains are never touched for the supply of the houses; the houses would be supplied by the smaller pipes taken from the main pipe, and rising through the arch, and then carried along 3 or 4 feet from the surface of the ground.

3597. Mr. *Burke.*] Was there a considerable pressure upon those pipes?—Yes.

3598. Mr. *Jackson.*] The pipes in the subway are trunk pipes from which the smaller pipes are taken from which the services come?—Yes.

3599. Mr. *Burke.*] Are you aware of the system proposed here, of adopting galleries instead of that mode of laying gas and water services?—Yes.

3600. In your judgment, would that increase the danger of explosion?—Yes; of explosion it would.

3601. Mr. *Paull.*] It has been pointed out to you that if there is a down draught down one shaft, the air that comes down must be got rid of by another shaft?—That must be so, or by other means, at all events.

3602. Do I understand you to say that the intermediate shafts would obstruct the current in the tunnel?—They would break it up into little compartments, within one or two, or many of which, there would be no circulation of air; there might be a local ventilation, but there would be no general ventilation; many blocks of air might never be changed scarcely; in other places there might be a draught up and a draught down, and a change take place; but if it was broken up by all those openings, you could not at all depend upon perfect ventilation; you must have a current passing off in one direction.

3603. So that, although air must escape up one shaft, there might be sections of the tunnel in which there might be bodies of air which would be stagnant?—Yes, where there would be no change, probably.

3604. Did you find two or three consecutive shafts in that subway of Garrick-street or Southwark-street, in which there was a down draught?—In every one in Garrick-street, and it struck me as being remarkable, because I could not see how the air was to escape.

3605. Although there might be an up draught somewhere, there were, in your judgment, between those 60-feet distant shafts, bodies of air that were stagnant?—There might be; of course, in accompanying the Committee through as I did, I could do no more than ascertain by a candle at each hole that I came to which way the draught was; but I am quite sure from what I know of ventilation, that if dependence were placed upon such arrangements as these only, there will be no effective or efficient ventilation.

3606. So that if there was a down draught between the two shafts, or at the two shafts, then the body of air between those two shafts might become impregnated with gas or any other vapour that was escaping?—That seems to me to be quite obvious.

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3607. They would not be subject to any other current of air that was blowing upwards in any other shaft?—No.

3608. Between the shafts of 60 feet interval, with lateral passages of 20 or 30 feet interval, might there be such an accumulation of gas as would not be influenced by any current?—That is clearly my opinion.

3609. And in that space of 60 feet, and in those two or three lateral passages, might there be such an accumulation of gas as to blow up the street?—I think so.

3610. Viscount *Galway.*] Is the ventilation the same in the subway, do you consider, whatever the state of the atmosphere may be?—I have no doubt it would change with the state of the atmosphere; but I saw there was a paper delivered in showing the temperature of the subways, as compared with the temperature outside, and I find, that in some cases in hot weather, the temperature is 30 degrees warmer in the external air than it is in the subway; and in cold weather there is a great difference; in moderately cold weather, there is generally a difference of about 15 degrees; now the warmer the air is the more rarified, and the colder the air is the denser.

3611. You stated that there is a down draught; supposing that there is a wind blowing from the north, would a breeze of wind make any difference in that subway?—Very likely it might; I think it possibly may; if the wind could get into the subway in any way, it would create a current which would produce proper ventilation.

3612. It has been given in evidence, that a breeze of wind, there is no doubt unquestionably will get into the subway if there is a down draught?—Supposing it is blowing in the direction of the subway; but if it is blowing across at right angles it would produce no effect.

3613. You stated that at the south-west end of the Garrick-street subway you did not find any draught?—I was not there the other day.

3614. I found a very strong draught?—I think that it would do if you had a strong draught coming in at one end, and a sufficient means of exit for it at the other end, and not until it got to the other end, then you would have a good ventilation.

3615. Mr. *Jackson.*] It has been stated by the witnesses, that if there were one ventilating shaft, and another witness said two ventilating shafts at each end, and one shaft kept warm, that there would be an abundant current of air sufficient to ventilate the whole subway; do you agree with that?—Yes; if you divide the subway into sections so ventilated; if you have a sufficiently large shaft at one end, and an equally large shaft at the other end, and then put a cross wall on close to those shafts you then would have that section properly ventilated.

3616. If you had an upcast shaft at one end, say 40 feet high, and at the other end you had a downcast shaft, do you think there would be a current of air sufficient to ventilate that subway, however long it may be?—Not however long it was; because that would depend upon the current of air required.

3617. I am assuming that the down shaft is sufficiently wide to admit of a sufficient current of atmosphere into the subway, and that the up shaft would carry it off, do you not think that by that process the subway would be properly ventilated?—I think that subways may be properly ventilated upon the principle you suggest; but all I contend is, that the small openings which they have put in, and which I have seen, are altogether erroneous and of no use; but you may ventilate a shaft if you apportion the means of admitting and withdrawing the air according to the size and length of the subway to be ventilated.

3618. It depends upon the indraught, and the space you allow for the column of atmosphere to pass through and for its exit?—You must have a rapid current if you are to carry off the injurious escapes of gas, a very rapid current; and therefore you must have a furnace at one end, in order to have it sufficiently warm in the shaft, to form an up draught.

3619. That is to say, if you cannot create a draught of air in the subway, it must be done by warming one of the shafts?—Yes.

3620. Mr. *Bagwell.*] You say that to make a perfect ventilation you ought to shut up all these holes?—Yes; all the small ones.

3621. All the apertures for ventilation into the street?—Yes.

3622. As a non-scientific means sometimes the best way to ventilate a room at the top, is to open the top windows is it not?—If you will consider the very question put by one of the honourable Members; you have a down draught at two openings at 60 feet apart, there can be no change of air between those two openings.

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3623. *Chairman.*] Why not if there is lateral motion?—If there is a down draught, there is no lateral mòtion.

3624. It must go somewhere?—It goes in other directions; I feel quite satisfied that you may have the ventilation cut up by these small openings, which are in these subways; you may have masses of air between opening and opening which are not changed, or not moved with sufficient celerity.

3625. Mr. *Jackson.*] Unless by the mode spoken of?—If you adopt the mode which the Honourable Member speaks of, and you have a draught all in one direction for a sufficient distance, and of sufficient quantity, you have perfect ventilation, but not otherwise.

3626. Mr. *Bagwell.*] Supposing the chimney of the fireplace stopped, and you had gas escaping here, and only a window open?—Supposing you had no means of admitting the air except through the window, you would have no ventilation at all.

3627. *Chairman.*] You are supposing what is impossible?—If you opened one window there would be no ventilation; if you opened two windows there would be.

3628. The wind comes in all round us?—Not in the subway.

3629. In the room, I mean?—If you had no fireplace, and had no means of air coming in or going out, except through one window which you opened, you would have no ventilation, if you opened two windows, you would have ventilation.

3630. Mr. *Bagwell.*] If you were living in a room with no fireplace, and only one window, according to your view you would have no air?—If you opened the window at the top and bottom you would have ventilation.

3631. *Chairman.*] Is there any difficulty in your mind in introducing gas mains into subways except the expense?—I think that gas mains would be dangerous.

3632. But water mains?—With water mains it is a matter of expense and inconvenience.

3633. Inconvenience to the water companies?—It would involve a great number of inconvenient arrangements.

3634. Which must be set against, as I understand you, the inconvenience to the public, in opening the streets?—No doubt.

3635. Otherwise there is no objection, in your mind, to water pipes lying in the subways?—The difficulties may be got over, but in my mind there are no counterbalancing advantages that would warrant the expense.

3636. With reference to the analogy of a coal mine which you have spoken of, if that were possible which is perfectly impossible, namely, to ventilate the coal mine by openings or shafts at every 100 feet, do you imagine that they would have adopted the costly expedient which they have recourse to now?—I think they would always endeavour to get a continuous current of air in one direction.

3637. Notwithstanding their ability to make openings into the open air as there are at every 100 feet, we know that could not be done; and therefore they are obliged to have recourse to artificial means of ventilation; but supposing that that were possible, do you think, under the circumstances, that that analogy would be a fair one?—There would be sufficient air by the openings to enable a man to breathe and to live; but I am quite sure that to get perfect ventilation, sufficient to carry off any explosive gas, you must have a current almost amounting to a wind, and you cannot have that by these openings.

3638. When the openings are a mile asunder, or even 2½ miles asunder, do you imagine that you can have a current of air in the workings?—In the workings you get a very perceptible current in a coal mine.

3639. In the workings 2½ miles away?—In the galleries there is a very perceptible current; you can feel it upon your face; it will blow your candle out almost.

3640. Near the shaft?—No; two miles from the shaft.

3641. The question I ask you is this; If you could ventilate the roof of the mine, if that were possible, do you imagine that all these expensive proceedings which are adopted for ventilation, would be necessary?—Not for working in the mines.

3642. But for getting rid of the fire damp, I mean?—Then you want a current, as I said before, almost amounting to a wind. As a proof of the accuracy of my opinion with reference to ventilation, if you light a candle and drop it down into this cannister, it will go out in less than a minute; it will have consumed the

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the air, and not being able to supply itself with fresh air, such as will support animal life, it will go out. And in the same way, if you put a mouse down, it will not consume so much air as the candle, but after you have put the mouse down it will die; the mouse would not live in this cannister.

3643. Have you ever tried that?—I have tried it with a candle, I have not tried it with a mouse.

[The Witness withdrew.

Thomas Hawksley, Esq., called; Examined by Mr. *Burke.*

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3644. I BELIEVE you have been largely engaged, not only as a Water Engineer but as a Gas Engineer?—I have.

3645. And have constructed large waterworks and gasworks both in England and abroad?—I have.

3646. Have you turned your attention to the question of subways as a means of accommodating the pipes of water companies and gas companies?—I have, very much; not merely with respect to the projects in London, but also it has been forced upon me with regard to the actual construction of subways in Nottingham. I happen to be the engineer to both the Nottingham Gas Company and the Nottingham Water Company, and I made the whole of the works of both those companies.

3647. I believe that you were consulted also, were you not, as to the construction of subways in London?—I was.

3648. Was there a competition between engineers as to the mode in which those subways were to be constructed?—The Metropolitan Board of Works advertised for schemes or devices for subways, and they proposed to give a certain number of premiums for the best plans, and I had the honour of being appointed with a number of other gentlemen to consider those plans, which I think amounted to 14 or 15 in number. We reported what, in our opinion, were the best designs; but also carefully guarded the question as to whether any of them were suitable for the purpose.

3649. You were one of the judges, were you not, for determining which was the best of the competitive designs?—Yes.

3650. Although you determined as to which was the best, have you at any time expressed an opinion in favour of the construction of subways, as a means of conveying gas or water pipes?—As a means of conveying gas pipes, they would be most dangerous devices; with regard to water pipes, the question is one of cost, and convenience mainly; there is one subject which is a very material one, and more with regard to water pipes, which possibly has not entered into the minds of those gentlemen, who do not happen to be water engineers, and that is, that water is frequently turned off, and then that the air which is in the subways must necessarily enter the pipes; cases of that kind are exceedingly numerous, and it is a very offensive thing no doubt, to have water pipes filled with foul air, when the water is turned off.

3651. Mr. Bateman has stated that the Legislature requires that water pipes and gas pipes should be laid a considerable distance apart as he stated, on account of the intermittent supply, which leaves the water pipes sometimes free from water?—Yes; there are a great many Acts in which that provision is made.

3652. *Chairman.*] Is it attended to?—Very much so in some places, but very commonly it is not attended to, and for this particular reason, that there are so many difficulties in laying pipes in the streets, that they are very frequently compelled to come into proximity.

3653. Mr. *Burke.*] Of course if there was an escape of gas, and the gas pipe was adjacent to an empty water pipe, that water pipe might be affected by the escape, might it not?—Yes it might, but only under particular circumstances; I have known myself such a case as this, that in a water closet, the air coming from the water pipe has actually been lighted in consequence of the water main having been filled with gas; but that is not a common case; I would not put that as an ordinary incident; it is an extraordinary one.

3654. How would it be if there was any access to the sewers in the subways; would that have a tendency to affect the water pipes?—Whatever may be the condition of the air in a subway, that air must find its way, no doubt, into the water pipe, when the water is shut off, and the pipe becomes emptied.

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3655. Supposing subways are to be adopted and made useful, the suggestion is that they are to contain water pipes, gas pipes, telegraph pipes, and matters of that kind, are they not?—Yes.

3656. If the opening of the pavements in the streets above is to be prevented, those subways must be applied to all those purposes?—Yes.

3657. If water pipes are there, they must be main pipes, must they not?—In a great number of instances (and certainly in all those streets in which it may become necessary to make those subways, which will be the most important thoroughfares, according to the theory upon which the subways are proposed to be constructed), there must be two pipes at least; one for the conveyance of the general water to a very large district, and the other for the supply of a particular street. One is called the main pipe, and the other is called the rider pipe; those are necessary always to run together in those cases.

3658. In addition to that, there must be the service pipes?—Then there must be, what in the case of water works are called communication pipes; all the lead branches going into the houses right and left, and which will cross about in the subways, and do cross about in the subways, of course, in a variety of directions.

3659. Then there must be provision made, I suppose, for the fire-plugs in the streets?—The great difficulty touching water pipes, no doubt, will be in this: there are a vast number of bends, branches, hydrant pipes, and connecting stop-cocks, and various other things to be used along with the water pipes, and those are not at all represented in that picture. I have had this made since I have been in the room (*exhibiting a diagram*); this is an 18-inch pipe, and that is an 18-inch pipe shown there (*pointing to the diagram on the wall*); this is an ordinary stop-cock for an 18-inch pipe, and that is the magnitude of the stop-cock. Now, there are numerous plugs, then the hydrant would have to come out here, and there will be branches, and bends, and connectors of various kinds. But let us take the case of what is a common thing now, a 36-inch pipe; that is a 36-inch pipe, and a 36-inch cock, on the same scale as this picture is drawn. If it is placed so, it might be placed sideways, or it might be placed obliquely; but there it is, like a garden gate. Then, here is a 24-inch cock; now, turn that about as you will in any way, there it is.

3660. *Chairman.*] What is the machinery which renders all that height necessary?—The sliding valves. The door of the cock has to slide up in this way (*describing the same*), and when it is up, the part which is represented here by this, comes up there, and takes up that part.

3661. How thick is that?—The width of that, in a cock of this proportion, a 24-inch cock, would be about 10 to 12 inches in this direction (edgeways), thin, but of this proportion in dimension. Then the next difficulty is that there are all the intersections which are not represented here. Imagine there is another street coming across here, and all these pipes, and branches, and cocks, placed again in that way, one set placed this way, and another set placed that way, blocking up the whole of this; and the service pipes ramifying off there, and coming out of that pipe, and going on there, and large pipes going down this street, the whole thing would be a mass of confusion. Then imagine that all that is complicated with gas pipes, gas mains, telegraph pipes, and all those other things which are supposed to go into the subways, in my opinion, it amounts to a thing that is nearly impracticable, I do not say entirely.

3662. Mr. *Jackson.*] In the report you made with Mr. Stephenson, were all those difficulties stated?—No, none of them; that report went solely upon the resolution of the general Board of Works; it is confined to perhaps 20 lines, and does no more than touch the subject matter, which we were authorised to touch.

3663. Mr. *Burke.*] You have never given any report have you, to the effect that in your judgment the adoption of the mode of conveying water pipes would be the proper thing to be adopted?—I have never given such a report, and I do not know anybody who has; that is to say, connected with the promoters of the Bill.

3664. We have dealt with water pipes, and you have shewn what objection there would be to water pipes; I suppose in like manner the gas companies would be required to have mains to carry their gas to distant districts, and separate mains for supplying particular streets?—They would.

3665. So that there would be a duplication of mains for the gas companies too?—The gas companies would have very large mains, and those would throw out

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out branches to every street and court almost, but they would not require separate pipes for the supply of the particular street, because the system of supplying gas is very different from water; it is done without considerable pressure, and consequently the use of stop-cocks in gas works is avoided; there are other means as a rule of stopping gas.

3666. We are told that there are to be galleries made for the conveyance of water and gas to the houses on each side?—I suppose what are shown upon those plans.

3667. There is more than one telegraph company in London, is there not?—Yes.

3668. Their wires would also be put in pipes, I suppose?—Not in general; I think the wires would in all probability be suspended above those side galleries; they would probably have cables, as they are called, containing a good many wires, and those cables would probably run along the top.

3669. Does it appear to you that it would be with all those pipes and intersections an easy thing to provide a tramway through the subway, which would be available for the pipe at all times, for conveying pipes of heavy calibre?—It would not be at all easy unless there were two gas pipes; it is a very undesireable thing as every gas man knows; supposing this to be a water pipe, and that to be a gas pipe, and a person on this side of the street wants gas, the gas must be got across in some way or other, taking it up there, for instance, and bringit round here, and then taking it along there; on the other hand the water must be got across to the other side, because a person on this side wants water as well; this must be taken up here, and carried round here, and taken along there, or it must be taken in some other direction, which would be exceedingly inconvenient.

3670. You have pointed out a mode of carrying it, as it were, under the roof, and laying service pipes from side to side. If they were put horizontally, of course that would block up any means of taking a tramway through the subway?—Yes.

3671. So that the only alternative would be, if you are to have an available tramway through the subway, that you must carry all those services up and round?—You must carry them up and round, or you must carry them in a very objectionable way down and underneath, and in that case, of course, there would be this objection, that as gas deposits moisture you would be very apt to have the service pipes obstructed.

3672. The other mode would be, that there should be separate mains for the supply of gas and water on each side of the subway for the street?—I do not say that that could not be done another way, but it could not be done without some objection.

3673. That would complicate the water pipes in the subway?—In a busy place, this interlacing of gas and water pipes would really be a very great obstruction; there is no question about that in the mind of any person who is acquainted with the subject.

3674. You know as much as most engineers of gas and water; is it not the fact that the companies are constantly obliged to alter and enlarge their pipes to provide an increased supply for a particular locality?—What would happen, I apprehend, would be this, that just the same amount of work will have to be done in the subways that is now done in the streets, with this exception only, that the pavement will not have to be taken up, and the earth removed and put back again; but there will be practically the same number of operations to be performed, both in respect to gas and water. The difficulty is this as to subways, that it does not so much touch the question (although that is a very important one), of the slow leakage of gas from joints, as it does with regard to the question of accident. For instance, we know very well, practically, that in laying the pipes and extending them, you would have a great many workmen; you would have all the gas men, and all the water men, and all the sewer men, and all the telegraph men at work in these subways; the result of that would be, that as happens above, so in the subways, there would be accidents; the smaller pipes would be kicked off or the large pipes would fall upon the gas pipes, and you would have an issue of gas in large quantities, and in time the subway would become charged with gas, and that to a very large amount, and it is almost inevitable that an explosion will happen, for this will occur. The man who occasions the accident will either be suffocated or he will run away; he will not remain there to stop the issue of gas; if it is a considerable accident he will not stay there, he will get out of the way if he can; perhaps he cannot, then this place becomes loaded with the gas issuing. Suppose even by these ventilators which you speak of, there is a mixture of gas and air, if a light is struck by any means, a carriage or a horse going over the ventilators, an explosion would be inevitable. Explosions in trenches very often happen, simply by striking a blow with a steel pick upon a stone; that has been one of the most common causes of explosions and ignitions in trenches. Perhaps there is a cigar thrown down or a match, nobody knows what. The subway must be entered afterwards. There are so many things that will occasion an explosion, that I consider in the event of any of those accidents an explosion is inevitable. Then this acts differently from what takes place in a coal pit; there being no considerable weight upon those subways the street would be blown up; in a colliery explosion you cannot blow up the earth, because in many instances there are, perhaps, 1,000 feet of earth upon the galleries of the mine, but here there is next to nothing, and the whole street would be blown up in a moment, and great damage would be done, and there might, and probably would be, a considerable loss of life. Then comes the question of who is to pay for damage which may be occasioned by a workman, he may be bringing something into the place, and may damage a gaspipe, or it may be done by the gas man or a telegraph man, or any body else.

Mr. *Rodwell.*] I rather think that we are travelling somewhat into a larger question than is necessary.

Chairman.] Will you confine yourself as much as possible to answering the question.

3675. Mr. *Burke* (to the *Witness*).] We may admit, I suppose, that with care, accidents may be staved off for a considerable time?—Yes.

3676. But I gather from your answer that the circumstances attending the laying of the pipes here would be such as to render it possible, if not probable, that accidents would occur?—I consider that accidents are inevitable; but it is quite uncertain when they may occur; there is a certainty of death, but no man knows when he is to die.

3677. If an accident did occur, it might be attended with such serious injury to adjacent property that it would be inexpedient to risk it?—I think very much so as regards gas pipes.

3678. Were you consulted as to laying subways at Nottingham?—Yes.

3679. Were you engineer for the gas and water company and for the Corporation?—Yes.

3680. What advice did you give them?—The advice I gave was this: the Corporation made the subway, consulting nobody; and when they made the subway, they asked the water and gas companies to put their pipes in it. An objection was raised, the thing was very much discussed, the Corporation became very much excited upon the subject; and inasmuch as the subway was of very inconsiderable extent, not 200 yards in length, and inasmuch as there was a rise in that short distance of 27 feet, which would, under all ordinary circumstances, have secured ventilation; and inasmuch as no main pipe whatever had to pass down it, nothing but a little pipe of four inches diameter for water, and another of four inches diameter for gas, I advised the gas company thus: I said to them, "There will, in all probability, never be another subway made in Nottingham, and in my opinion, for the sake of peace and quietness, you had better allow these pipes to be put in." The danger apprehended was such that cocks were put at each end for the safety of the men, and other extraordinary precautions were taken that could not in an ordinary case be taken, and that is the state in which the thing remains to the present day. There are very few houses, and the street is not yet wholly built upon; it happened to be a short new street, and I believe there are only, I think it is either 11 or 13 services taken altogether.

3681. The experiment is one on a very small scale, is it not, as compared with what is proposed to be done under this Bill?—I do not think that there is anything analogous. But there is more to be stated than that; and that is, that the Corporation have since, without again taking any time to learn what the views of the companies were, made two other small subways, one of them 200 yards, and the other, I think, about 100 yards.

3682. *Chairman.*]

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3682. *Chairman.*] We have had the length of them?—Yes, whatever they are; the gas and water companies have again considered the subject, and the gas companies have decided not to put their pipes into these subways, unless the Corporation would guarantee them against the consequences of any accidents.

3683. Mr. *Jackson.*] We have it in evidence that they propose to give that guarantee?—That is not the fact in one sense, and the true sense, and the material sense; in the first place they have not the power to do it.

3684. Mr. *Burke.*] Did you hear Mr. Paget?—I was in the room part of the time, but I could not very well hear him; but here is the whole of the correspondence and the resolutions..

3685. *Chairman.*] We have them already?—I imagine not; you have something, but I think you have not the proper thing.

3686. Mr. *Jackson.*] I suppose they acted under your advice when they refused?—No, they acted quite independently; I had, it is true, given them advice previously, but long previously. They considered this question quite independently of me, and here is the whole of the correspondence, both my correspondence and the resolution of the committees, and these I have brought to lay before you, and then you will have the subject touching the Nottingham subways quite complete. (*The same were handed in. Vide* Appendix.)

3687. Mr. *Burke.*] I will ask you, generally, whether you are the party responsible for advising the gas and water companies at Nottingham?—Yes, I am responsible so far as I have mentioned, and if my time were to come over again I should certainly not advise them to lay them in the Victoria-street subway; but I thought that was the first and last of them, and being a matter of exceedingly little consequence, it was desirable to oblige the Corporation.

3688. Supposing there were advantages attending the laying of the pipes in the subways, such as are represented on the other side, would it not be the interest of the gas companies to avail themselves of them?—Yes, certainly; we should only be too glad to avail ourselves of these advantages, if the disadvantages were not ten times greater than the advantages; I mean ten times greater, not as regards simply the company, but as regards the public.

3689. I suppose that it could be no fun to the gas companies to break open the streets in preference to laying pipes in the subway?—In regard to that there is no appreciable difference in the cost, and for this reason, that although the expense for the opening of the ground and making the pavement good again is saved, yet the difficulty of working in a subway is such, that it occasions quite as much expense as the other way, being a much slower operation, and being done without a good light. What I saw the other day about the reflectors is pure nonsense, because those reflectors were operating in the bright sunshine, which is 20 or 30 times the intensity of the light in the winter months. These reflectors would reflect nothing in the winter that would be appreciable; but apart from this, we know that reflectors only send a direct light, they do not send a diffused light. You gain nothing on the side of the pipe that is entirely in the dark shadow, and although you can see by means of reflectors down the tunnel, you cannot see under the pipes, unless by means of additional light.

3690. We have heard that an escape of gas would be shown by the discolouration of the paint; even if it were you would be able to see nothing by the reflectors?—Gas will not discolour paint. There is no purer gas, as regards sulphuretted-hydrogen, than the London gas; it contains bi-sulphide of carbon, which is a different thing, and does not operate in that way; but as regards sulphuretted-hydrogen there is no purer gas than the London gas. It will not discolour paint.

3691. *Chairman.*] Then the paint in my house, which is discoloured, is discoloured from some other cause?—It must be from something else.

3692. Mr. *Burke.*] The gas companies provide that it shall not discolour paper saturated with acetate of lead?—Yes.

3693. And you know of no invention in paint that would enable parties to discover the impurities of gas by the discolouration of the paint?—I was not aware that anybody said anything so silly as that; that is only a test for impure gas; pure gas does not discolour paint at all.

3694. Mr. *Jackson.*] Do you ever find any pure gas?—Yes; free from sulphuretted-hydrogen.

3695. Mr. *Burke.*] It is said there is some patent invention of paint which detects gas, whether pure or impure?—There is nothing of that kind.

3696. But if there were, then, if I understand you rightly, this system of reflection would not give light enough round the pipes to let you see where that was?—First of all, this system of reflection would be of no use, or next to no use, during nine months in the year; and in the other months it does not give you a diffused light by means of which you could work. Wherever a ray is interrupted by any object, or where it does not reach, everything is in black shadow. There is nothing new about this; it was once tried in railway tunnels 25 years ago; they tried to light railway tunnels, which is more important.

3697. Mr. *Jackson.*] But was not it the rapid circulation of the air, caused by the trains going 40 miles an hour, that put the lamps out?—I am speaking merely of the use of reflectors; the reflectors were of no use.

3698. Mr. *Burke.*] Supposing that the existence of gas was ascertained by the smell in the subway, what mode would suggest itself to you of discovering where the escape took place?—The ordinary mode of going to the place with a safety lamp.

3699. Have you turned your attention to the question of ventilation?—Very much indeed.

3700. Have you seen any existing mode of ventilation adopted in connection with these subways which, in your judgment, would be efficacious for getting rid of the explosive mixture caused by the gas?—There is only an artificial mode, which is inapplicable; we cannot, even in a great city like London, have all this immense apparatus in connection with public arrangements; it would not do to fill a town, either with vertical shafts, having fires at the bottom, or to have fans in the subways.

3701. You could not establish any such means of ventilation now?—No.

3702. Did you hear Mr. Bateman's evidence?—No, I did not.

3703. Have you seen the Garrick-street sewer?—Yes.

3704. Do you know that there are little apertures in the roof which are said to afford ventilation?—I was there, and took particular notice of certain experiments made by the Honourable Members of this Committee; I watched the effect of a candle, and I am bound to say in the Garrick-street sewer there was no sensible ventilation at all going on; there was a slight ventilation, no doubt, but with regard to both the subways, the experiment was defective in a most material respect; in both the subways the apertures by which we descend into them, and they are very large apertures, were left open, and in the case of the Southwark-street subway, that was the cause of a very large draught; it let out the air which came in through these apertures, but apart from that, in the Southwark-street subway, which we visited when the wind was blowing strongly, there was a very considerable draught through certain of the smaller ventilators, and it was some time before I could make out the cause of that; I attributed it in my own mind to some artificial effect, as if there had been a blower at work somewhere, and I inquired if there was, and I was told that there was not; I then began to search about, and in a very few minutes I found the true cause of it; the true cause was nothing else than this, that there are some little apertures here (*pointing to the top of the plan*), which caused a large draught, the doorway being now open; there were some small apertures, as I have described; little apertures made to the side of the streets, and I went to see what could induce the wind to come so strongly through those apertures, and I found that they were connected with these cellars (*pointing to the plan*); there are no houses here, and there were apertures open to the day in the arches through which they went, the wind being high at the time, and this being in a place to catch it, the wind was blowing strongly into those cellars, and then coming into these apertures; so the whole thing was explained in a moment.

3705. Mr. *Rodwell.*] Did you satisfy yourself that there was a connection with that cellar?—I did.

3706. I am told that that is not the case?—I had the sewerman with me, whose name is Mike Govin; I give you his name, because I think it might be a serious question.

3707. *Chairman.*] This is a very grave charge?—No, it is not a charge that I bring forward, it was an accident.

3708. No, there is no accident about that?—This is a very natural thing; I do not know that this represents exactly the state of things; this is the Southwark-street sewer here.

3709. If

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3709. If there was any deceit practised upon the Committee, I think it is a very grave charge?—There is no deceit about it.

3710. Do you mean to say there was an accidental orifice which exists upon the spot?—The side of the street is not built up.

3711. The width of the street is 80 feet; it must be 40 feet of way through under the paling?—Not 40 feet to there; you see that is under the street; there is no such thing as 40 feet there.

3712. If it is no charge, it is no charge?—It is no charge at all; it is only an explanation of the draught downwards.

3713. What was it, then?—The side of the street is not built up, and there are certain open apertures communicating with the air not left purposely for a thing of this kind. It had nothing at all to do with that.

3714. And opening into the ventilating shaft?—Communicating with the smaller ones.

3715. Mr. *Paull.*] There were two kinds of shaft; one was a large open one, and the other a small one, about a foot square?—Yes.

3716. You are speaking of the one a foot square?—Yes.

3717. Which did not communicate with the open street?—No.

3718. *Chairman.*] Where did that come into?—That came into the subway; that is intermediate between the larger apertures which you see depicted, although that does not represent the works in the street between these larger apertures; and I think the Honourable Member, who is now questioning me, is the very gentleman who held the candle in his hand.

3719. Viscount *Galway.*] Do you mean the outer gallery which went into the cellars?—That which went laterally.

3720. There was a square hole cut out of the sideway into the cellar?——

Mr. *Rodwell.*] I am distinctly informed that there is no communication whatever with the cellars.

Mr. *Burke* suggested that there should be a cross-examination upon this point.

Witness.] I am trying to describe what I saw, and I tell you who it was that pointed it out to me.

3721. Mr. *Rodwell.*] Did you see, yourself, a communication from that subway into a cellar?—No, nor could I; that is utterly impossible, because that is underground.

3722. Mr. *Paull.*] In the crown of the arch there was a shaft communicating with the street?—Yes.

3723. At certain intervals there were small square holes about a foot square?—Yes.

3724. The square hole was in the crown of the arch, in the same kind of spot, it was the shaft communicating with the street?—Yes.

3725. Then do I understand your evidence, that from the square hole there was a horizontal communication under the street, and will you say where, if that was so?—I cannot distinctly say whether that were so, because I did not see it; but this man, Mike Govin, said that it communicated with this archway, which is open to the day (*pointing to the left hand side of the plan*), I believe at this very point.

3726. *Chairman.*] Under the concrete of the walling?—No; it is exactly at a point where the houses here are actually built out; the ground is low, and there are some arches open, and the wind was blowing into those arches.

3727. Where did it go to?—I have no personal knowledge, because I could not see it; but I have this Mike Govin's description; then it went along the lateral gallery, a small drain, and turned about there (*pointing to the middle of the plan*).

3728. Mr. *Jackson.*] Was there a cellar in the concrete?—I suppose the hole was something like a square brick thing, about 12 or 18 inches square.

3729. Mr. *Paull.*] Whatever it may be worth, Mike Govin told you that there was a communication from that small square hole in the crown of the arch, along to a cellar?—Yes.

3730. That is what he told you?—No, not along to the cellar; but he said that the air which would go in there (I asked him particularly about it), would come out into the subway at that place.

3731. But if he pointed out to you that square hole in the crown of the arch will

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will you describe what he told you further?—What happened was this; I found that at these holes there was a quantity of air coming down, which was greater than at the large aperture, a thing I knew to be impossible under ordinary circumstances. Now if it merely communicated with the atmosphere at the same level and in a similar situation, it is quite impossible that more air could come down there than elsewhere; then I went up and I inquired what it was, and this person that I told you of, explained to me that it did come through there.

3732. *Chairman*.] Under the concrete into this small shaft; did you see any small shaft?—No, there was no small shaft here; it only explained why there was a larger draught in that small aperture than I should have expected.

3733. Viscount *Galway*.] As to these small passages, which go out of the subway into the cellars right and left, going from north to south on the left hand side, in one of these was a small square aperture; I asked the reason of that, and as I understood it was to lay the service pipes for the water and the gas, but then I do not suppose that that would be left open; probably that may not be left open when the thing is completed; this is a small hole that was merely made for the purpose; that was the answer given to me?—That is so.

3734. Mr. *Paull*.] That was so; I saw the hole in the wall between the lateral passage and the sewer through which the pipes were to go; but what you are talking of now are square holes in the crown of the arch, in addition to the shafts communicating with the street?—Certainly; and to which, if I remember rightly, you held the taper.

3735. *Chairman*.] You mean a hole not opening into the street above by a grating?—Not at all.

3736. You do not know where it went to?—No, except from the inquiry; I was induced to make an inquiry, which I do not think, after all, is of the slightest importance in theory; it only explains what we happened to see upon the occasion; namely, a strong down draught at that aperture, which did not exist at the large aperture. That was a phenomenon that I could not account for; and therefore I went up to make the inquiry, and the result of the inquiry was first finding these arches. And then I inquired of this man, who was the man to whom I was referred, as to whether the air that entered those arches would go along to this opening, and he told me it would; but all this will be blocked up when the street is completed; it only explains, if it be true, a particular phenomenon.

3737. You do not know whether it is true; you only heard it from this man?—I know this, as a scientific man, that more air could not come down that aperture than could come down a larger aperture; because, if they both communicated with the atmosphere upon the same level, of course there would be no difference of draught between them; the draught being very violent, a remarkably violent draught, I was induced to make the inquiry, and that led to this explanation which was given to me, and I have only carried that explanation to you.

3738. Mr. *Burke*.] First of all, scientifically speaking, would you conceive that if there was an escape of gas, that would pass through the surrounding atmosphere and find its way to the aperture in the roof, or mix with the surrounding atmosphere?—It depends entirely upon circumstances; at one time of the year and in one state of the atmosphere it would go off, and at another time of the year and at another state of the atmosphere, it would mix with the atmosphere and would not escape out of the subway; I think I could make that clear to the Committee very simply; the air is heavier by 1-480th part for every degree of cold; you may easily get 30 degrees or more of difference in temperature between the air in the street and the air in the gallery, and that would make the air in the gallery 1-16th heavier than the air in the street, and there the air would lie stagnant; now, suppose that gas escapes into the air, and we have many instances in gas works of explosions arising from these causes; supposing, I say, that it escapes into the air, then to form an explosive mixture, we only want about 1-14th of the bulk of the air as gas; the gas is nearly one-half lighter than air, and that would only make a difference of 1-30th; the effect of the gas would be a difference of 1-30th one way, while the effect of the temperature would be a difference of 1-16th the other; and, accordingly, we know that the air under those circumstances would remain in the subway; it cannot be denied that we constantly get explosions in cellars and various other places from these causes.

3739. I gather

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3739. I gather from that that it would depend upon the state of the atmosphere, whether the gas, or the explosive mixture rather, would escape, or whether it would not?—Certainly.

3740. In certain states of the atmosphere, you are distinctly of opinion that, there being apertures in the roof of the subway, the explosive mixture would not escape without a current?—Without a current and a competent current; a current that would not merely clear out the main galleries, but would clear out these lateral shafts, or, as I should call them gas traps; in these lateral shafts the air would be more stagnant.

3741. It is proposed to have the side galleries for the admission of pipes for gas?—Yes.

3742. Might they then become receptacles for explosive mixture?—These are exactly the sort of places where we do get explosions from gas, and exactly the kind of places where explosions have their origin in coal pits.

3743. So that, even if there were a current of air in the subway, might there not still be a risk of the explosive mixture being confined in the side galleries?—Yes.

3744. So that, even with ventilation, you still run the risk of explosion?—Yes

3745. To have an efficient ventilation, I understand you to state that there must be, as I suppose Mr. Bateman said, an up shaft and a down shaft, with, probably a rarification of the air in the up shaft?—There must be some artificial means, especially in all these subways, which are horizontal, or nearly so; where the subways are so rapidly inclined, as happens to be the case in Nottingham, it very rarely happens indeed that air is not pouring either down or up, because, whatever difference of temperature there may be, if the air is colder, it may run down hill, although you cannot see it exactly like water.

3746. The more horizontal the subways is the greater the need for artificial ventilation?—Yes; the subways in London must necessarily be exceptionally horizontal, because, in the main streets, in which it would be necessary to make subways, there is very little difference of level.

3747. And without adopting artificial means, which they have not thought it necessary to adopt, I understand from you that there would be no ventilation in the subways?—In certain states of the atmosphere there would not, and in certain others there would be a good ventilation.

3748. To go to the particular instance which you discovered the other day, do I understand you to state that whatever current of air you found was coming down and not going up?—Yes; but still I ought to make myself right upon that; you know, as regards the Southwark subway, the whole experiment is worth nothing, because that great big door was open.

3749. But if the great big door was open, that might have the effect of letting in air to drive the air up to the roof?—Yes; but I am speaking now of these holes: I thought you were directing my attention to that of which I had been previously speaking; but, as to other apertures which went up into the street, the current was alternating; sometimes it was upwards and sometimes it was downwards.

3750. We will come to that; is the little aperture, which the Honourable Member referred to, of a foot square, an aperture for the purpose of laying the service mains, or an aperture to aid ventilation?—I suppose, but I will not go beyond that, it is to aid ventilation, because it seems to me to be in the wrong place for the other purpose; but I may be wrong about that.

3751. Assuming that it is for the purpose of ventilation, if it be for the purpose of aiding ventilation, is it to have a vent anywhere?—I suppose it must in the end have some other ventilation than I have been speaking of.

3752. If it were to aid ventilation, it would not be blocked up at one end?—There again I suppose there must be some aperture made, or to be made, near the part here (*pointing to the plan*). I saw one on the opposite side of the subway; but whether the other is to have an aperture there, or not, I cannot say.

Chairman.] If it is there at all, it is the first time I ever heard of it.

Mr. *Burke.*] The Honourable Member saw it.

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3753. *Chairman.*] These little openings are 100 feet apart. I want to know where the square opening was; was it intermediately between two, or midway? —I will not undertake to say whether it was midway or not, but it was intermediate.

3754. And in the crown of the arch?—Exactly in the crown of the arch.

3755. Mr. *Paull.*] How many did you see?—I cannot say; I was not particularly interested in looking into the matter.

3756. Mr. *Burke.*] Was there more than one?—Yes, there was more than one.

3757. *Chairman.*] How many did you see?—I did not go over the whole length, I only went a little distance each way.

Mr. *Rodwell* suggested that it would be a great saving of time if the Committee had the real statement of facts from Mr. Bramwell.

Witness.] I do not think it is material at all to the question of ventilation, but only to the particular experiment.

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3758. *Chairman.*] How many openings are there, if any, intermediately between the two shafts, in the crown of the arch, which end in the gratings in the streets; in the square holes?—I believe that there is one between each opening.

3759. There is an opening?—Yes, certainly.

3760. Between each ventilator?—Between each ventilator at that end of the subway. Having given that answer, will you allow me to tell you, in my own way, in the absence of Mr. Bazalgette, what this thing really is?

3761. Mr. *Burke.*] Are you speaking of your own knowledge, because I cannot allow any hearsay evidence?—I am speaking of my own knowledge.—(*The Witness pointed out the position of the openings on the plan.*) The subway originally was ventilated in two ways; the eastern end in one way, and the western end in the other; the western end had those small openings which Mr. Hawksley has spoken of, and had not those direct openings into the street; those squares are about nine inches square, or a foot. From those openings come those cast-iron pipes, whether six feet or nine feet I do not know; that goes here into a species of subway, which has a grating over it in the roadway of a similar kind to the grating which is here, so that that end of the subway was ventilated in the manner which threw no light into the subway, and the other was ventilated differently, in the manner that the subway in Covent Garden is done. The ventilators at the western end are altered to the condition of those at the eastern end, leaving in those which I firmly believe have no connection whatever with the subways.

3762. Mr. *Burke.*] I do not know that?—I do know that they had a connection with the roadway; I have put my head up one of the openings, and have looked up the pipes.

3763. Mr. *Jackson.*] Would that cause a greater circulation?—I should not have thought that it caused so much as was stated to be going on the other day; but now that I know it, it does not strike me as improbable.

3764. Mr. *Burke.*] This only applies to a certain number of shafts, and it has been abandoned with regard to a certain number of others; that was an intended mode of ventilation which has been abandoned for the adoption of another mode? —One part was ventilated by one mode, one by another; the other being found preferable, this was changed.

3765. You mean by a preferable mode the addition of the shaft without this opening; you have stated that, originally, this 9-inch square hole was made to ventilate and without that upright shaft; and that subsequently the upright shaft had been adopted in other cases without the 9-inch hole?—Yes.

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3766. Mr. *Burke* (to Mr. *Hawksley*).] Did you find that this little square hole rather aided the current of air than otherwise?—Yes; but that is not, certainly to an engineer, a person who has to deal with the facts, an explanation of the phenomenon, because the current of air down this aperture, which, in consequence of the tortuous path, and the small diameter of the pipe, ought to have been smaller than the other, was very vastly larger; if I was to multiply it by

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by four or five times as a question of velocity (I am speaking in the presence of an Honourable Member who observed it), I should not be exaggerating, and that was a fact which I ascertained myself, but I do not think that that has anything to do with the general question of the ventilation, because that will be stopped, if it be as I was told; that will be stopped if the street is built up, and that has no bearing whatever upon the general question of ventilation.

3767. There is, according to Mr. Bramwell's statement, an opening in the roadway; a grating, as he says, at the extremity of this line?—So I understand.

3768. That of itself might let in air?—Yes.

3769. But it is admitted only into this chimney, as it appears to be according to the drawing there; that would have no effect on the general subway ventilation?—Any air coming in will have exactly the same operation as the air in the downcast shaft of a colliery; the air will become diffused, unquestionably, over the whole subway, with the exception of the side galleries, and whatever comes in must escape somewhere else, consequently there is something somewhere always; if air comes down, there is a downcast shaft, and if air comes up, there is an upcast shaft. That does not apply to the side galleries when they are ventilated, or attempted to be ventilated by those little chimneys.

3770. Have you attempted, as far as you could, to ascertain the cause of that anomaly?—Yes, I was very much struck with it; not that I thought that it had much to do with the general question, but, as a phenomenon, I went about to inquire what was the cause of it; it was pointed out to me by the person to whom I was referred. I took him to the place; we went to the edge of the railings where those side openings are, and I asked him whether there was any communication between them and this horizontal drain, and he said that there was. I merely remarked then, "That being on the windward side explains the whole thing, and I can now understand why there is a greater current down the smaller aperture than down the larger one."

3771. Your simple object was to get an elucidation of what appeared to you to be an anomaly?—Yes.

3772. And you took the best means to ascertain the causes of that anomaly?—I did.

3773. From the information supplied to you, which Mr. Bramwell has mentioned, you were told that there was a lateral aperture there, and not an aperture into the roadway?—Yes, but there are apertures into the roadway unquestionably, because I saw some small gratings myself.

3774. But whether they exist or not, that would have no material bearing upon the question of ventilation of the two subways?—Not at all; it only removes out of the way the doubt as to the cause of that phenomenon.

3775. And leaves the subject to be discussed without that?—Exactly.

3776. And you still adhere to the opinion you have expressed, that without some new mechanical means for ventilation, any mode at present adopted would be utterly inefficient for ventilating these subways?—Under the circumstances that I have mentioned; that is to say, horizontal subways, and no artificial means of sending a current through them at the periods when the air is stagnant.

3777. And, consequently, in any particular state of the atmosphere if an escape of gas took place, that escape would mix itself with the surrounding atmosphere and would not escape, but form an explosive mixture, which, in the presence of fire, might blow up?—Yes; in all cases of escape I have no doubt that an explosive mixture will be formed, and the danger of it will depend upon whether, in the case of accident, the escape is large; or whether, as under ordinary circumstances, the escape is small. Now I must state that the escape from gas mains is very small indeed, and may be almost entirely prevented.

3778. *Chairman.*] It may be made a minimum?—It may be made a minimum; it does not now, to the best of my knowledge and belief, exceed three per cent., and that is so small in amount, taken with regard to other things, that that is not a kind of danger to which I attach very great importance; the danger to which I attach the greatest importance, is the danger which results, and is inseparable from those casualties and accidents which always do occur in connection with pipes. It is not from the transfusion, as some persons have called it, or from the bad jointing, and things of that kind, because those can be prevented; but there are persons, such as telegraph men, and sewer men, and watermen, who would have to go into the subways, and you must even have policemen in them. Accidents will happen continually with those small pipes of one kind or another, and even with large ones, if large works are being carried on in the subways, and it is then, in my opinion, that the greatest possible danger would arise.

3779. Mr. *Jackson.*] You are speaking now of gas?—Yes, I am speaking of gas.

3780. Mr. *Burke.*] In your judgment, would those subways very much diminish the number of workmen to be employed?—No, it will diminish to a certain extent the number of labourers, namely, those labourers who are occupied in taking up the pavement and digging up the trenches, but those labourers who are employed in addition to the skilled artisans, those who are employed in moving materials backwards and forwards, will not be diminished in number; on the contrary, they will be increased in number, because it will be more difficult to work in the subways, and to get materials to their places than to work in the open street.

3781. Then it would involve this, that the water company's labourer must, of necessity, guard the gas pipe as well as the pipe of his employer?—He must take special care in confined situations not to do damage of any kind; he must care for everything; but you cannot make him care for everything.

3782. Have you found that you always can insure perfect care in the workmen employed?—No, it is not in the nature of a workman, who receives from 2 *s.* 6 *d.* to 5 *s.* a day, to care very much about anything; he does his work under one employer this week, and if he is turned away he gets another employer next week; and although they may be very decent workmen, they do not take extra care; they take ordinary care.

3783. Practically, it would involve the adoption almost of a subway police to superintend all the operations of the company?—There must be a superintendence, no doubt; but when you speak of police, there is no doubt that vagabonds will get amongst workmen down there and conceal themselves, and must be hauled out by the proper police, and this we know. It is not a thing in which we have no experience. They have a sort of large underground vaults in the streets of Madrid, and they have just been obliged, within the last twelve months, to have a kind of underground police to look after them; and only imagine the clever thieves in London, who would be ensconced in those side galleries, and working into jewellers' shops, banks, and every place they could; it could not be left without police.

3784. The class of gentry getting in there might not dislike to let a little gas out for the sake of a scramble?—It would be very possible.

3785. Would it involve the necessity of constant supervision, in order to detect an escape of gas or an accident arising in the subway?—There must be some kind of extra supervision, because of all these small twiggings they are very lightly attached, and they cannot be attached very much stronger, and accidents, would, no doubt, be continually happening.

3786. There would be a chance of accidents happening from the breakage of service pipes in connection with private supply, from gas finding its way into the subway through those galleries?—Coming back.

3787. Coming back?—I do not think that there is much probability of the gas coming back; there would be some, but not much, probably; it is far more likely that the gas would get out at the end of the subway into these side cellars, which, I presume, are to be coal cellars, and so on.

3788. Have you read the Bill?—Yes.

3789. What is your notion of the provisions of the Bill as providing fair provisions for both parties?—The provisions of the Bill, so far as regards the charges upon the gas and water companies, and so far as respects the onerous nature of the obligations which would be imposed upon them, are very objectionable; and if the Honourable Committee will allow me to explain why, I will do so, because that has been a matter of great correspondence.

3790. Mr. *Rodwell.*] Could not Mr. Denison do that better than you?—I am not so sure about that.

3791. Mr. *Burke.*] Will you state in what respect this Bill appears to be objectionable?—The important clause, as it strikes me, or rather the important code of clauses, as there are three or four of them, are those which relate to the manner in which the companies are to be charged.

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3792. *Chairman.*] Those are two, are they not?—There are more than that.

3793. Mr. *Burke.*] First of all will you let me ask, does it appear to you, first, that if the companies are to pay for any presumed advantage they get, they ought to be paid if they are put to any disadvantage?—I suppose Parliament would not make any such provision as that; the only provision that I suppose Parliament might make in transferring pipes and so on into the subways is, that with regard to pipes already laid down, the company should not be put to any expense; but that is a mere trifle in comparison to the obligations which the company would have to bear in respect of rent. The mode in which it is proposed to determine the rent is most extraordinary.

3794. Mr. *Rodwell.*] Will you be good enough to refer to the clause, as we are now discussing the legal effect of it?—It is the practical effect of it. I am often arbitrator in cases of this kind.

3795. What clause are you looking at?—Clause 10, but that is only one of them; Clauses 8, 9, and 10 go together; 10 is the mode of estimating the payment, and 9 is the machinery. "In determining in any case the amount of payment under this Act, the arbitrators or umpire acting in the arbitration shall have regard to the pecuniary benefit accruing to the company, body, or person, using the subway, by reason of saving in respect of leakage, and in respect of the expense of and connected with the laying, fitting, inspection, and repair of pipes, and the opening and relaying of roads, and paving and repairing, and otherwise, by reason of the use of the subway." Now, in the first place, that is only part of what he has to do; in determining it he is to have respect to these (but not merely these) particular instances. Of course, if I were advising the Board, they would say the cost of the subways is so much, you are coming to lodge in it, and you must pay a rent in proportion to the cost.

3796. *Chairman.*] That is not in respect to anything they have there?—No; this is not the limit of what he has to do; these particular things he has to pay respect to.

3797. I do not see what the cost has to do with it?—I would first point out the sort of question that would be raised. You are a very able arbitrator, and have had great experience. The Board would say, "We have expended a large sum of money for your benefit, and you, the telegraph companies, water companies, and gas companies must pay the interest and cost of maintenance of it. Then comes the great question of leakage. Our leakage, so called, is 15 per cent.; that is the actual fact all over London."

3798. Mr. *Burke.*] That is not the leakage only?—That is what may be called the leakage.

3799. Unaccounted for gas?—Yes; that is the proper explanation of it, and that is made up of no less than 10 elements.

3800. *Chairman.*] All that the arbitrator would inquire into?—Yes; but what is to happen to the company, and why should the companies, if they have to pay rent for the use of the subway, pay for the sum expended.

3801. Mr. *Jackson.*] The cost of the subway has nothing whatever to do with the rent they have to pay; they have to pay a rent equivalent to the use they make of the subway?—If that is the meaning of the clause it is very easy to express it so, but it is not expressed so, therefore this is not the limit of it. I am enabled to say that.

3802. Viscount *Galway.*] You mean the words "having regard to the pecuniary benefit accruing to the company;" you mean that the cost of the subway would be taken into consideration in determining the rent?—I have no hesitation in expressing an opinion that the question of the cost of the subway could be taken into consideration in excess of, and beyound this; there are only some things which the arbitrator is bound to inquire into.

Mr. *Rodwell.*] I object to the clauses being gone into now.

Mr. *Burke.*] Perhaps the Honourable Chairman will tell us what is intended.

Chairman.] This evidence appears to me to be premature; this is a matter of clause, and could be easily set right when the Committee come to the clauses of the Bill.

Mr. *Jackson.*] I am of opinion that the cost of the subway can have nothing to do with the charge to the company.

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Mr. *Burke.*] That is just what I wanted to get at; let me state the position of the opponents of the Bill. We are now, it is true, upon the preamble; but you know that if we should happen to be defeated upon the preamble, and we go into the discussion upon clauses, it will be said hereafter, if we were to appear against the Bill: "You were heard upon the clauses in the House of Commons, and are not entitled to be heard upon the preamble here;" I cannot, of course, say what we might do if the preamble was decided against us, and I think we ought to know what is the intention of the Board of Works; they are the promoters of this Bill, and they know what they mean; my learned friend says he is their interpreter; let me have it in black and white.

Mr. *Rodwell.*] If my learned friend says he wants it in black and white I can give it him.

Mr. *Burke.*] We say this clause is ambiguous; and if it is ambiguous it is enough for us to say so.

Mr. *Jackson.*] Does not the clause tell you what they mean; the clause to my mind, tells you precisely what it means.

Mr. *Burke.*] It does not to my mind.

Mr. *Jackson.*] If it does not, let us see whether we can alter it.

Mr. *Burke.*] I say that if you pass the preamble I am precluded from going into the clauses if I want to oppose in the House of Lords, and it might be my policy to state that I could not go any further.

Mr. *Jackson.*] Cannot we come to an understanding what the clause means?

Mr. *Rodwell.*] I have stated that the outlay was not at all the measure of the rent we were entitled to charge; it was merely the suggestion of the Committee of 1864, and merely had reference to the advantage which the companies would derive from the subways; the clauses 8 and 10 were framed to meet that; my learned friend is asking you, most irregularly, to discuss clauses.

Mr. *Burke.*] No; I am upon the principle.

Mr. *Rodwell.*] If I have not made it clear I am blameable; if my learned friend has not read what I said he is blameable; I will just read what I said; I say with regard to the 10th clause, that it is the mode of estimating the payment; "That gives the arbitrator this power, that if there is no benefit at all accruing to the company, they would then have to pay nothing; but we are perfectly content to abide by that clause." That is what I stated; and so far from making our outlay the measure of the rent they are to pay, I have studiously pointed out that that was not what we meant; it was simply a question of benefit derived.

Mr. *Jackson.*] You must allow me to appear as counsel for the public, so to speak. You are very well aware that in the various Gas Bills which the companies work under, they are limited to a certain per-centage; if, therefore, a very heavy fine is inflicted upon the gas companies the public will be injured, inasmuch as the price will not be reduced until they arrive at the maximum profit; and if the public, through the Board of Works, are going to be charged, for a longer period than they would otherwise be, a high price for gas, it becomes essential that I, as one of the public, should take care that they are not so charged; and therefore I think it necessary that it should be clear that the public, through the companies, are not to pay one penny piece for the construction of these sewers.

Mr. *Rodwell.*] By Clause 8 "The Board may, if they think fit, demand and receive payment, by way of annual rent or otherwise, from any company, body, or person, for the use by them or him of any subway; and in case the amount of any such payment shall not be agreed upon, the amount to be paid shall be determined by arbitration, in manner by this Act provided." And the 10th clause refers to arbitrators.

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Mr. *Burke.*] May I suggest two words being put in that 10th clause, "nothing but." "In determining in any case the amount of payment under this Act, the arbitrators or umpire acting in the arbitration shall have regard to nothing but the pecuniary benefit;" then I shall understand it. If you put those words in, I shall understand your meaning better.

Mr. *Rodwell.*] Perhaps you will prepare a clause.

Mr. *Burke.*] No; I am not going to be caught in that way.

Mr. *Rodwell.*] Will you take the clause if I put the words in?

Mr. *Burke.*] No; I do not intend to be caught in that way.

Mr. *Jackson.*] With regard to the 8th clause, could not it be managed in this way: "And in case the amount of any such payment shall not be agreed upon, the amount to be paid shall be determined by arbitration, in the manner by this Act provided"; and then put in some words to show that the costs of the undertaking are not to be considered in the amount of the rent.

Mr. *Rodwell.*] There will be no objection to putting that in; the arbitrator would not have to consider what the outlay had been, because, by clause 10 he would be limited to the pecuniary benefit derived, which is to be the measure of the rent; but still I do not see the slightest objection to putting that in.

Mr. *Burke.*] My learned friend, I dare say, would not object to putting in the word "only"; "only to the pecuniary benefit."

Mr. *Rodwell.*] Let my learned friend discuss his clauses.

Mr. *Burke.*] No, I will not discuss clauses.

Mr. *Paull.*] A question was put to Mr. Hawksley, and I understood Mr. Rodwell to object to it; do you object?

Mr. *Rodwell.*] There is no use objecting; but I do object to Mr. Hawksley coming here and having a discussion on the clauses before we come to the clauses; that is premature. If my learned friend is going to accept clauses, that is another matter; why are we to be discussing clauses, and why do you call Mr. Hawksley into the chair for that object.

Mr. *Paull.*] Is it irregular to put a question to a witness to know how, as an arbitrator, he would construe a clause?

Mr. *Rodwell.*] I think at this present moment it is premature and irregular, unless my learned friend will discuss clauses with me.

Mr. *Paull.*] Then, if it is not done now, how would it be possible to obtain it from the witness after the case has closed.

Mr. *Rodwell.*] My learned friend might have taken the question as to the preamble of the Bill. I do not believe there is a word about it in the preamble; he might have put a case, if so and so were to happen.

Mr. *Paull.*] I understood Mr. Hawksley to be answering the question.

Mr. *Burke.*] I appealed, not to my learned friend, but to the Honourable Chairman. I asked Mr. Hawksley the meaning of the clause.

Cross-examined by Mr. *Rodwell.*

3803. When were the pipes laid down in the Nottingham subway?—I think in 1862.

3804. Has any inconvenience been experienced by the introduction of the pipes into the subways?—No material inconvenience, beyond the necessity of shutting off the gas, and the objections which the men have to go into the subway; they are afraid to do so

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3805. You have found that you cannot get men to go in?—We do get men to go in; we make them go in.

3806. How can you make them go in?—We shut off the gas at both ends, which it would be impracticable to do if it were not such a small and insignificant street. If gas in that street were burnt, as is very common in the streets in the day-time, we could not shut it off, but from the first they have exhibited very considerable reluctance to go into the subway; they will not go there without having the gas shut off.

3807. Did you hear Mr. Easton's evidence?—No.

3808. Did you hear the evidence of the gentleman who was called here, and the evidence of a man who constructed the works in the subways?—No, I should not pay much regard to the evidence of persons of that description.

3809. You say that you do not regard the statements of men who have been working there with their fellow-workmen; would you regard their opinion at all as to danger?—No, I should not, because that subway and neither of the subways is worked under the ordinary circumstances under which subways must be worked, if they are largely introduced into the London system; they are a kind of drawing-room subway.

3810. Did you hear Mr. Greaves examined?—No.

3811. Have you been informed that Mr. Greaves, who was your witness, has stated this: "Can you, from your own knowledge as an engineer, representing a company which supplies the east of London, state any objection to the introduction of water pipes not in connection with gas pipes in the subway?—Setting aside the question of expense, I do not see any. Q. Setting aside the question of expense, you do not see any. Now a word as to the question of expense; I understood you to tell my learned friend that you could give no evidence as to the first cost, therefore, your evidence as to expense is confined to repairs?—I will not say that I can give no evidence as to the first cost; but I say that it is a very difficult thing to give evidence that would be properly applicable to the case from the difficulty of defining the case." Do you, as a water engineer, agree with him that with the exception of the expense, there is no objection to putting water pipes in subways exclusive of gas?—There is not much objection with regard to placing water pipes in subways, irrespective of the expense, which will not be inconsiderable, and the inconvenience, the inconvenience I mean of making substitutions from time to time, and alterations and so on, excepting in these two particulars; first as to the probability of the foul air getting into the water pipes when the water is turned off, which is an objectionable thing, but to which I do not wish to attach too much importance; and next as to the case of breakage. Water mains under great pressure are very liable to burst, and do burst, and it would be an exceedingly unpleasant thing, supposing you had a very large pipe 30 inches, or 3 feet, in the subway, for it to burst; you would find considerable damage and great inconvenience occur.

3812. I suppose some damage would be done if it broke in the earth?—No, very little damage; it blows up the pavement, and the water distributes itself.

3813. It sometimes floods a few sewers, does it not?—Sometimes, but not generally.

3814. Then there is the breakage and the contamination?—I do not want to put the thing too high as regards waterworks.

3815. Do you believe in the theory of water in pipes which go through the subway, being contaminated by escape from the sewer?—Not directly; the water will pass out from the pipes, but the air cannot get into the pipes when the pressure is on.

3816. Supposing they are empty, or when they are full, taking them from year's end to year's end, do you suppose that in the case of the water pipe laying in the sewer, the water passing through that would be contaminated?—The water is only contaminated in the degree in which any noisome air would contaminate it when the water is first turned on again.

3817. But do you think that a person drinking the water, or any chemist with the most elaborate analysis, could detect the impurity?—I do not think he could, because the foul air is driven into the houses of the people when the water is turned on.

3818. Where does the water come from?—It would come from the subway.

3819. But

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3819. But that is independent of the question of the pipes; first, I understood you to say that you thought the water pipes, being in the immediate vicinity of the sewer, would get contaminated?—O dear no; I meant exactly what I said; that when you have anything to do to a water pipe you must draw the water off, and the interior of the pipe must become filled with air, and that air would be foul air, and that is a thing which is offensive to many people; and if it is an objection amounting to prejudice as touching the water, it is a thing which I do not think is desirable, because people are very particular, and every year they are becoming more particular about their water.

3820. Do you find that your water pipes get contaminated by their juxtaposition to the sewer, or by being embedded in a sewer connected with the gas?—No, because the water is not let out in the same way. There are occasions when there are two leaks occurring near together; I have known a case where a gas pipe has leaked, and where, near to it, there has been a leak in a water pipe, and the gas, when the water is turned off, has got into the water pipes.

3821. That would not happen in a subway?—That would not happen in a subway.

3822. Did not that happen from the earth being saturated with foul air?—No; it is a very rare thing; when it happens it happens from the two leaks being close together, not from the saturation.

3823. Do you mean if there had not been two leaks, and the ground had been saturated with gas, the water would not have imbibed the flavour?—No; it is not from the noisome matter which is turned up in the streets which makes an actual flow of gas into another pipe; do not think that; I put that as a common incident. I have known it to take place more than once, but it is rare.

3824. As to this leakage, I think you stated that the amount of leakage was very slight, and that was owing to the vibration of heavy traffic passing over the streets?—The question I was asked was, whether, in the case of heavy traffic, that tended to produce leakage, and I said, "Yes, particularly with regard to the junctions."

3825. After you had said that you did not believe much in leakage from pipes, and you talked about *endosmosis* and *exosmosis*, I ask this: "Does the heavy traffic" (*reading to the words*) "anything else"?—That is not the junction of one pipe with another, but the junctions of the streets.

3826. I asked about the word "leakage;" did you not, when before the Gas Committee, give the two answers which I have just read? — Yes, which I now explain, and wish to explain again.

3827. I do not care about the explanation, I have got the fact; would not the inconvenience and detriment, as you state there, which is due to vibration, be removed by the pipes being placed in subways?—Yes.

3828. With regard to Nottingham, you gave your consent for the sake of peace and quietness, and to quiet the corporation?—Yes.

3829. Why did you not give your consent on the second occasion?—Because we were disappointed in our expectation that the corporation would not make any more subways; and because, in the meantime, there had been a Parliamentary inquiry, and Parliament had come to the conclusion that subways were not very desirable things to make; and then there is another thing, which is the most important of all, and that is that any accident happening to gas, either by the operations of the gasmen or watermen, or of the other men working in the subway, would be almost certain to throw the company into a frightful compensation question, and we were desirous, knowing how very explosive gas is, and what are the consequences of these great explosions, not to have a large sum to pay under Lord Campbell's Act, or for damage to property.

3830. You bought this peace and quietness of the corporation of Nottingham, at the expense of the company running that risk?—Yes; but the risk was in the particular case to which I have referred, namely, the first instance, a minimum risk.

3831. What was the difference in the extent of the second subway, as compared to the first?—That the second had a leading main to pass through.

3832. That was the difference?—Yes.

3833. Supposing that it had not been for the leading main, would you not have assented?—It was the street with the greatest traffic in Nottingham, and when, of course, in the event of an accident happening, there would be sure to be injury to life and limb, because it is perfectly crowded with people.

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3834. I understand then the result of your evidence, if I put it shortly, is, that you think subways for gas and water pipes impracticable?—No; they are not by any means impracticable, but they are infeasible and impolitic.

3835. If they are infeasible and impolitic, they are, so to speak, practically impracticable; you would not recommend anybody to use them?—They are practically impracticable; I adopt that phrase.

3836. Have you always been of that opinion?—Always.

3837. You were one of the parties who were to adjudge this premium for the Southwark-street improvement?—Yes.

3838. Did you then express your opinion as to any of these subways being practically impracticable?—I did.

3839. How came you then to sign the report?—The report is perfectly consistent with our duty; if we had been called in here to report about placing barrels of gunpowder under the Houses of Parliament, we should have made a report consistent with our duty, but we should not have troubled ourselves by going into the question as to whether it had been proper to place barrels of gunpowder under the Houses of Parliament unless that had been referred to us; if it had been referred to us we should have given our opinion upon it.

3840. You state now that you think that they are practically impracticable; now, how came you to attach your name to these reports: "The difficulties in the way of arriving at a satisfactory decision have been very great; no general principles were found to apply, nor was it possible either to approve or condemn all the parts of any of the designs submitted to competition; your Committee have therefore selected those designs which appeared to them to be most susceptible of such practical adoptions as would render them most generally applicable to the circumstances of the metropolis;" that is the report; your name, I see, appears there, No. 2 there?—The order of them is immaterial.

3841. Were you of opinion then when you signed that report, that these designs were not susceptible of practical adaptation, so as to render them applicable to the metropolis?—They are applicable to the metropolis; they are applicable in the sense of that report, and they are inapplicable in the sense in which I am giving evidence before this Committee, namely, that it would be very imprudent to have such receptacles for gas mains as are proposed by this Bill.

3842. Now you are Mr. Hawksley, the witness; then you were Mr. Hawksley, the arbitrator?—I was one of nine, and I could but, of course, concur with my colleagues generally, but not in every form of expression; it would be quite nonsense to suppose that; for instance, this Honourable Committee may have to make a report; there would be difference of opinion upon the language, but they would concur in something, at least; but it is not that every gentleman thinks the particular words used are words binding upon himself.

3843. Was not this the very essence of the inquiry?—No, it was not any part of the inquiry.

3844. Let me know what it was. "That prizes be offered for public competition for designs showing the best mode of laying out the surface and subsoil of the new street in Southwark, as an example of a first-class street; and also of the street in Westminster, as a second-class street, showing the disposition of the private vaults, sewers, gas, and water pipes, telegraph wires, with any parts of the soil appropriated to other useful purposes." Now, I ask you whether the very object of their offering those premiums was not to get the best scheme, and the same scheme as that before the Committee?—Undoubtedly.

3845. I ask this further question: is it not the fact, that the scheme to which you gave the prize was substantially very much that which is the scheme now before the Committee?—It was.

3846. I understand you to say, now, that you signed the report, not agreeing in the terms of it?—I do entirely agree in the terms of it. The best scheme that was presented, no doubt, is the scheme which is represented upon that wall, but that has nothing to do with my private convictions as to whether it was a desirable thing that in London such constructions as these should be made for the reception of gas and water pipes.

3847. Have you public convictions and private convictions?—No.

3848. What do you mean by saying your private conviction?—That was upon a matter not referred to us. My opinion was given upon the matter that was referred to us.

3849. What were those designs for?—They were given by the Metropolitan

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Board of Works for the purpose of deriving from them suggestions with regard to laying out streets for the purposes which are mentioned there, as to whether those are proper purposes, as to whether the Board of Works were right in their view as to that being a judicious thing to do; we have nothing whatever to do with that; and I would award a prize to a man who proposed the best scheme for the worst object that could be possibly secured; but I had nothing to do with that.

3850. Will you be good enough to tell me this: you selected those designs which appeared "most susceptible of such practical adaptations as would render them most generally applicable to the circumstances of the metropolis?"—Yes.

3851. Do you consider that that scheme is capable of adaptation so as to be applicable to the circumstances of the metropolis?—To the circumstances of the metropolis, irrespective of the points upon which I am now giving evidence.

3852. The object of the premium being to show "the best mode of laying out the surface and subsoil of the new street in Southwark as an example of a first-class street, and also of the street in Westminster as a second-class street, showing the disposition of the private vaults, sewers, gas, and water pipes," &c.?—No, if you will just look at it in a common-sense point of view.

3853. Look at it yourself, if you please; if you would only just say yes or no, I should conclude my question; was not the object of this premium to secure the best mode of dealing with the subways in the metropolis?—No, it was to secure the best mode that anybody could suggest; but the best mode was a bad one.

3854. Was it capable of adaptation, in your opinion?—As to adaptation, no doubt it is adaptable.

3855. Could you render that adaptable to the circumstances of the metropolis?—I do not quarrel with the adaptation, but I tell you that when you do adapt it, it will not be safe.

3856. You recommended as a scheme that which you now say is practically useless?—I do not say anything of the sort. I say that you may put your water pipes into it to-morrow, but that when you have them there it will not be beneficial to the public at all; that it is perfectly practicable as regards water pipes; practicable as regards telegraph pipes, practicable as regards sewers, practicable as regards lateral galleries, and in a certain sense practicable as regards the gas pipes, but it is utterly infeasible.

3857. Did you tell the Metropolitan Board of Works that those were your views, and that it was idle to give a premium for anything of the sort?—I did not use any such strong impression as the latter part of that.

3858. Nor anything like it?—I did; and Mr. Robert Stephenson concurred with me, and most of the other gentlemen who were with me.

3859. He is dead?—He is dead, and therefore I did not like to mention his name, but it was entirely concurred in. That question was not referred to us, and therefore no motion was made, nor anything of that sort, and in the introduction of such language into the report, we dealt with the question which was submitted to us, and nothing but that.

3860. With regard to those hydrants, and different matters which you suggested were necessary within the subways, do I understand you to say, that the large valves, or large apparatus which were put up against the wall are actually necessary?—Yes.

3861. Do you mean to say that you could not do without those in this form?—No, that is the actual form.

3862. Do you mean that that is the only sort of stop-cock that you could use at that particular spot?—I think so; I mean that we can contrive things of almost all manner of shapes.

3863. Do you know what Mr. Bateman, who was not asked these questions, is using at Glasgow?—I do not.

3864. Do you think that if it were necessary, your ingenuity could not suggest a smaller apparatus than this?—I do not think much smaller for a thing of that magnitude; place it as you will, it must occupy a great deal of space; suppose this is not used, and suppose you try a horizontal one, you must have a large bulky thing which will only occupy the ground the other way.

3865. And you think that nothing could be shorter than that?—Shorter in this direction, but longer in the other direction, by reason of its being altered.

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3866. You know Mr. Bateman's pamphlet, which he wrote upon the Loch Katrine Water, in which he says: "It will economise space where large valves have to be placed in public streets, the total area of the valves have been reduced from a seven square feet pipe to a four-and-a-half square feet" (*reading the same to the words*) "reduction in the dimensions of all the parts." Now, have I told you something to-day, have I given you some information or did you know this before?—You are reading me my own invention, which was adopted in the Liverpool Waterworks, and which I know perfectly well, and which would not do any great good in this particular case; the very first thing was made at my own office, before I left Nottingham, many years ago.

3867. Do you mean to say that Mr. Bateman is not using this usefully?—No, I do not say that; but it does not apply.

3868. If you can reduce the 7 square feet to 4½ square feet, that would just exactly comply with the requirement of this space?—I will give it you at once.

3869. This valve that you have shown me, is the full size?—You will see that what Mr. Bateman there proposes to do, is to reduce it to something like this (*holding up a small plan*), not giving a full bore of water-way, but a diminished water-way; then I have put this upon this (*covering a pipe marked on the plan with a cardboard model*) you can turn this any way you like.

3870. That being turned in any way I like, I want to turn the 7½ into 4 square feet?—You have misunderstood me.

3871. Do you mean to say that you could not employ it?—But it does not reduce all those other parts in the same proportion; that is a reduction of the water-way simply; it is not a reduction of all this apparatus about the water-way.

3872. It is to economise space where large valves have to be used?—No doubt; it is exactly what I have used for that purpose originally in the Liverpool Waterworks, and the effect of which I therefore know perfectly well, for I designed it myself nearly 20 years ago.

3873. Did you give up the use of them?—I never use them except in such an extraordinary case as the Liverpool case. There were a great many pipes there of 44 inches diameter; that was to enable us to get this part of the work underground, because if they had not been done so, it would have stuck up above the ground.

3874. Could you do that in the subways?—Of course you could.

3875. Why should you not?—Then it would reduce it to this (*producing another cardboard model*).

3876. If you reduced it at Liverpool, why could you not reduce it here?—Then this would become this (*exhibiting a model*).

3877. That is a 24-inch valve?—A 24-inch valve.

3878. Of the full size?—Yes; I am supposing them to be reduced to this.

3879. But why have you put a 24-inch valve on an 18-inch main?—I was talking of what is wanted in London. There are plenty of 36-inch pipes, plenty of 30-inch pipes, and plenty of 24-inch pipes.

3880. Just upon that question, I refer you again to this; you said that there would be a difficulty in the workmen getting inside and fixing the pipes; do you attach any importance to the evidence given by two or three gentlemen who have seen them at work?—No importance whatever.

3881. You would rather stick to your own view than take that of the men who have been employed upon the subways?—I have no doubt that those men told you the exact truth, but they did not tell you all the incidents which occur in the course of those practical operations to which I have alluded; and the little bit of work that they have done systematically in the particular arrangement of these subways has nothing at all to do with the ordinary conduct of a water or gas engineer.

3882. Would you have them do it otherwise than systematically?—They will do things systematically whether we are right or not.

3883. Who will?—These workmen will; the arrangement in Southwark-street (I do not refer to Garrick-street, because it is too small a thing to be worth regarding) is not a practical arrangement, but an arrangement which is devised for the purpose of what I may call this exhibition. The size of the pipe that is introduced may not be the size that a water company may want; the gas pipe may not be the right size, but it is very pretty to exhibit.

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3884. Supposing that those were all that is necessary, would you then say that is convenient, and that the subways are beneficial?—That is very convenient for the straight pipes, but it is not very convenient when you come to the junctions of lateral streets, and where the large pipes will have to turn out and cross over, and go in all manner of directions, and where they would be as thick as my fingers are, and placed in this way too (*interlacing his fingers*).

3885. Are you prepared to say that those pipes would not be sufficient?—I am not prepared to say that; if you mean for the streets themselves, undoubtedly they would be more than sufficient.

3886. I understand you that whatever the atmosphere is, whether cold or warm, the gas will rise?—No, the gas itself will rise just as a balloon will rise; but the explosive mixture of gas and air will not necessarily rise.

3887. Will not that depend upon the proportion of air to gas?—Combined with the former question, namely, the difference of temperature.

3888. I suppose that the explosive character of such compound is more easily made at one time than at another, according to the state of the atmosphere?—No, there is nothing in that; that will be the most minute particular—

3889. You are going rather into minute particulars, but I want to ask you this; if gas escapes it rises?—It does not necessarily; I am going to speak of it practically.

3890. Take an escape of gas from this pipe (*describing the same*), what becomes of the gas?—The gas would rise, no doubt, because its volume is so great, and then it would become dispersed over a very large area indeed in the subway. But there is another kind of escape: suppose that you have a small escape, and that the gas becomes diffused round about a particular spot, which is a very common thing indeed, and forms an explosive mixture over a small space, that will not rise into the air in the subway.

3891. Do you mean that it will never rise?—If you let it alone there will come a day when it will rise.

3892. Let us go by steps?—You will not allow me to go by steps; it will hang at first about a particular spot. For the purpose of this inquiry, it will always hang in the state of the atmosphere which I am alluding to; but in another state of atmosphere, however, it will not hang.

3893. What state of atmosphere are you assuming?—If the external air were to become colder, then the warmer air inside, including this explosive mixture, would go out, and the other heavier air would come in in its place.

3894. Then I suppose that the getting rid of this gas would depend entirely upon the system of ventilation?—If you are supposing an artificial ventilation, the thing is done so far, but if you are supposing a natural ventilation, the thing is not done.

3895. That must always depend upon the amount of the escape of gas?—No; if you had a large escape, and there is not air enough to mix with it so as to keep down the specific gravity below the specific gravity of the external air, then the gas will diffuse itself and go out through the ventilators.

3896. It seems to me that the larger the escape of gas the better?—Yes, in a sense, but the more dangerous it is, because if you instantly form a large body of explosive mixture in the subway, and there happens to be a light applied, off goes everything at once, you know, that would take place at the ventilator,

3897. When were you last in the subway?—This last week.

3898. Have you ever been in the Paris subways?—Yes.

3899. Mr. *Jackson*.] In what part would the valve have to be used?—Generally near junctions.

3900. If a chamber was made at the end of each subway, and those cocks were used, would not that obviate the danger you speak of, with regard to the size of a portion of it?—Supposing this that the subway were not to become a general system; but were to be merely isolated, one piece of subway here, and another piece of subway there, then it would be possible to put these cocks out at the end of the subways; but supposing on the other hand (and there is no limit to the future of this Bill, as I understand it) the subways become general, and attach on one to another, then they cannot be kept out of the subways.

3901. But I think it is defined in the Bill where those subways are to go, and that further legislation will be required, if there is to be any extension of them, and looking to the subways as they appear upon that Bill, do you see any necessity

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sity for putting those valves except at the end of each subway?—Not with regard to the large cocks; supposing you had a subway a half or three quarters of a mile long; or suppose you had a subway a mile long, I will not say that with regard to the large main, it would not be possible to keep the cock out of the subway at the ends.

3902. What we have to do is with the subways as they are stated in the Bill? —I think you will find it in the Bill. I am certain of there being a clause, it is the 3rd: "This Act shall apply to the several subways under any street constructed under the powers of the respective Acts set forth in the schedule to this Act annexed, and to any subway constructed by the Board in the metropolis, under the authority of any special Act passed in any future session of Parliament to which the provisions of this Act are extended;" not the new Act for subways only "by such special Act."

3903. That Act must be incorporated into another, and therefore there must be future legislation; therefore, as there is no subway beyond the length which you spoke of, and you say that those cocks are not necessary in a subway under a mile long, it follows that they are not necessary to be put into any of the subways within this Act?—No, I do not quite say that, because I cannot, at this moment, figure to myself in what way these pipes come into the subways; but answering the question generally, as well as I can on the instant, I should say that if you have detached subways, one here and the other there, it may be possible to put the large cocks out of the subway either at one end or the other.

3904. *Chairman.*] In the chamber?—Yes, or without the chamber.

3905. Mr. *Jackson.*] All these subways mentioned in this Bill are detached, are they not?—I think they are, but I am not quite so sure; there are three Acts mentioned here which I cannot answer for; there is the Metropolis Improvement; I cannot answer for that as to whether that is a single subway.

Re-examined by Mr. *Richards.*

3906. With regard to the pipes, you were asked whether the subway is not large enough to accommodate the pipes for the supply of the district. I suppose your leading mains may have to pass along the street for the supply of the district beyond?—Yes, and more than that; this is rather a further answer to the Honourable Member's question. You will have a large main coming across that subway, perhaps running down; the subway is running up the street, so you have a large main of three feet diameter to meet coming across it, and you have all these pipes crossing one another to get into the lateral streets; this looks as though there were no junctions; but this pipe (*pointing to the plan*) will probably have to turn round somewhere and go into another street, or the small pipe will have to go up that street. These will all have to be carried over one another, and there will be such a complexity of junctions that it is almost impossible to carry out the work.

3907. Mr. *Jackson.*] Did you see Mr. Bazalgette's plan for conquering that difficulty?—I saw it for a moment the other day, and I wondered what the metropolis was to come to if that plan was to be adopted; it is possible, but it seems like a new world underground.

3908. Mr. *Richards.*] It is a very expensive one, is it not?—Yes; the expense is enormous; it is a possible thing, but it is a thing which I cannot conceive that the ratepayers in any town would consent to.

3909. Assuming that a connection was to be made with a pipe in the lateral street, it would go up and then go down again?—I could make a dozen contrivances to overcome the difficulties I have mentioned, provided I had all the wealth of the metropolis to deal with; but that I do not consider it a practical thing, as an engineer, having regard to the limits to which expenditure can go.

3910. The scheme of this Bill is to throw all the expense upon the companies?—I cannot answer that question. But there is a point that I wish to mention, which is very material, I consider. These subways, if largely constructed, would put a stop to all the underground railways of a future day. How can you get across when a street is loaded with these things; you can neither go along it laterally or longitudinally, nor deal with it in any way; it is a complete block.

3911. Mr. *Jackson.*] At Farringdon-street, are they not making a railway under the Metropolitan Railway?—I have not been there. There is no difficulty in doing that upon high levels, because you can sink your railway sufficiently; you

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you may even, although it would be very impolitic to do so, dig your railway under the bottom of the sewer; but supposing that you came into the low parts of London, where you got below the water level, what are you to do?

3912. Mr. *Richards*.] I understand, with regard to the Nottingham case, of which so much has been said, you have got within one subway, but you declined to get into any additional subways?—Yes.

3913. And in regard to this scheme, of which you are said to have approved, certain schemes were submitted to you?—Yes.

3914. You selected one of them, not, in fact, approving of any of them very highly?—That is quite true; but the principle which is now before this Committee was never before us, and it was no part of our duty to consider that which it was the duty of the Metropolitan Board to consider.

3915. Let me call your attention to your answer to question 5052: "We did not think any of them were applicable, but we thought they might be adapted so as to remove a considerable number of the objections which were apparent on the face of them?"—Yes, but that is only as to the mechanical arrangement, not as to the objections which I have had the honour to state to the Committee.

3916. Mr. *Paull*.] Do you happen to know if any amount of rent was ever suggested as what would be payable by any company for the use of the subway?—When the subway question was before Parliament in the year 1864, there was a question of rent suggested that was considerably discussed, and the question then went simply on the cost of construction; now it is totally different.

3917. Did you ever hear that the amount of rent was fixed?—No.

3918. You never heard that any application was made by a company to lay the pipes in a subway, and to pay rent for it?—No, I never heard of such a thing. All that I did hear of was with regard to the Southwark sewer (and that is not upon authority), that the Board were desirous that the companies should go in there as an experiment, without payment of rent, but then that was only for the purpose of experiment.

3919. So that within your own knowledge the Board never fixed a rent per 100 yards or any distance?—No; at Nottingham the offer of the corporation was, that no rent should be charged, but still we could not get rid of the legal responsibilities, which are exceedingly onerous upon gas companies, and therefore we declined, subject to the corporation undertaking the risk, which they did not, because they could not.

3920. Did you try to persuade the members of the corporation at that time, who said that they were so satisfied with there being no danger, that they were ready to take upon themselves the indemnity?—There was nothing of the sort; I have the papers here, and therefore I am speaking with a full knowledge; what happened was, that one member of the corporation, the town clerk, and the borough surveyor, attended the meeting of the board, and this gentleman, who is a very enthusiastic gentleman, said that he had no doubt that the corporation (but he was speaking only in his own capacity) would give a guarantee; then it was stated by the town clerk that they could not give a guarantee, and of course the town clerk was right, as any man with the least legal knowledge knows.

3921. *Chairman*.] Was not there a resolution passed by the improvement committee that they would give a guarantee?—Not to my knowledge; and if there were, what the improvement committee did would be of no use, because they could not bind the corporation; the corporation seal could not bind them.

3922. Except individually?—They know better than that in the town of Nottingham.

3922*. I suppose Mr. Paget is a gentleman of respectability?—He is a very respectable gentleman, and one who has done a great deal of good in Nottingham; but he is very enthusiastic.

3923. Viscount *Galway*.] Before signing this report, did not you take into your consideration that there would be this difficulty about laying the pipes in the subway, when it was made?—Yes.

3924. And could you give a prize for a scheme when you thought that it was practically impracticable?—Yes, we all agreed upon that.

3925. It seems to me to be a very extraordinary decision; we had a simple executive duty to perform; our duty was to award the prize to the best of all the schemes that were presented to us; it was not our duty to say that any of the schemes were applicable; some approached applicability more than others; all that we had to do was to discover amongst this large number of schemes that which approached the nearest to applicability.

3926. Which was most generally applicable ?—Yes.

3927. For the metropolis, and not for Southwark only ?—Yes ; but those subways are perfectly applicable for a great many purposes ; they are infeasible with regard to gas ; we had no difference of opinion about this, but it was not our duty to report it, that gas ought to be omitted ; the subways are certainly applicable for water, for telegraphs, for access to the sewers, and for various other purposes ; then comes this, that with regard to water, all our experience shows that while they are applicable to the case of waterworks, waterworks are better out of the subways than they are in them ; I am speaking now as an engineer, acquainted particularly with the wants of waterworks, but that does not prevent their being applicable in the case of waterworks, they are applicable.

3928. Notwithstanding those large cocks ?—Yes ; those large cocks make the thing very difficult, and very troublesome ; they are very objectionable in a certain sense, but as the Honourable Member on your left has mentioned, there are means of getting over those difficulties. In fact, if expense is no object, I do not know what you cannot do, with the exception of being able to make gas which is not explosive ; you cannot do that.

3929. I suppose you were chosen by the Metropolitan Board of Works, and that was within your knowledge at the time ?—That I should infer ; but I had no information as to why I was chosen.

3930. And do you think that it was fair, having this moral objection, that a report of this kind should receive your signature ?—Perfectly fair, and wholly unavoidable. We discussed that very point repeatedly amongst ourselves, and we came to the conclusion, unanimously, that we had nothing to do with those questions ; that those were questions for a superior authority, and not for us.

3931. My Lord Galway has read words in your report which carried it vastly beyond that ?—I signed it as one of nine, and all that I can say is, that with my particular views, looking at the duty which I had to perform, I should be prepared to sign it again, and give the very same evidence that I have given today.

3932. Would it not have been fairer to have added a postscript to the effect that you did not think it desirable that these subways should be made ?—I think that I should have been regarded as rather a cantankerous individual (*The Witness handed in certain diagrams*). *Vide* Appendix.

[The Witness withdrew.

[Adjourned to To-morrow, at Twelve o'clock.

Thursday, 4th *July* 1867.

MEMBERS PRESENT:

Mr. Bagwell.	Mr. Jackson.
Mr. Duff.	Mr. Cornwall Legh.
Mr. Floyer.	Mr. Paull.
Viscount Galway.	Mr. Tite.
Mr. Grove.	

WILLIAM TITE, Esq., IN THE CHAIR.

Thomas Hawksley, Esq., further Examined by Mr. *Richards*.

T. Hawksley, Esq.

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3933. DO you put in a plan of the valves in use in the Liverpool Corporation Waterworks?—Yes. (*The Witness delivered in the same.*)

3934. Do you also produce the remaining portion of a correspondence to that which you produced yesterday, with the gas and water companies of Nottingham, with reference to the question raised between the companies and the corporation as to the subway?—I do. (*The Witness delivered in the same.*)

Vide Appendix.

[The Witness withdrew.

Mr. *John Thomas Woodhouse*, called; Examined by Mr. *Richards*.

Mr. *J. T. Woodhouse*.

3935. You are a Mining Engineer, and a man of large experience, I believe?—Yes; 40 years.

3936. And you have been much employed, I believe, in the Midland and Northern Districts?—I have.

3937. Have you inspected the subways in Garrick-street and Southwark-street?—I have.

3938. Assuming that gas pipes were laid in those subways, and any leakage of gas occurred, have you formed any opinion as to whether danger would ensue from subways constructed as they are?—If gas pipes were laid, and a leakage ensued, and there was no sufficient ventilation provided to carry off the gas, the ways would be in a very dangerous state, and there would be the probability of an explosion,

3939. Does your experience as a mining engineer enable you to say whether there is or not sufficient ventilation provided in those subways?—There is no ventilation at all of an effective character. I carefully examined the current of air in both those subways, and I ascertained that there was now and then a current down through the gratings, and now and then a current up the gratings, but with a degree of uncertainty, something similar to collieries which are not ventilated by artificial means, but by what we call natural ventilation; in certain states of the weather, such as to-day, for instance, the probability is that the ventilation in such collieries would be reduced to nil; it is only where there is a great difference in the temperature between the interior and the exterior that natural ventilation could be relied upon at all, but in this case it could not be. There are also, in these subways, certain recesses which run off, as I am informed, for the service pipes to the side buildings; now those recesses would be very dangerous receptacles for gas, unless they were properly ventilated, and if any leakage took place from those service pipes, the gas would accumulate in those recesses, and when an unskilful labourer went in, the gas would explode, and probably burn him, and perhaps kill him.

3940. Viscount *Galway*.] They are not exactly the same in the two subways, I think?—I think very nearly, but I do not recollect precisely; I have only been in once. I walked through both of them, and they are very nearly the same. They are at intervals, at something more than the length of this room; they appear to be very well done, so far as the construction goes; the masonry, and so on; that is all the right sort of thing.

3941. If I recollect, those in the Southwark-street subway are higher than those in the Garrick-street subway?—Yes; there may be some higher, and some about the same height.

3942. Mr. *Richards*.] Do your observations with reference to the amount of ventilation apply to both of them, constructed as they are?—Entirely. There is no doubt that with adequate ventilation, which it would not be difficult to obtain, the subways would be perfectly safe in skilful hands.

3943. How is adequate ventilation to be provided, by natural or by artificial means?—By artificial means; there is no natural ventilation which can be accomplished there. By proper artificial means there would be a very strong current of air introduced into every part of the subway, into every ramification of it, and, I believe, through all the sewers and everywhere, and it would be made quite safe.

3944. What do you mean by "artificial means;" a fan or something of that sort?—Yes; in this case by a fan; I do not state precisely the kind of fan; there are a great many fans used for ventilation. A fan is a machine, as the word indicates, simply for drawing off the air. There are a great many sorts of fans; but now they have come into very general use with fiery collieries, and they could be applied here with equal effect and with perfect safety. There is a fan which was put down upon my recommendation in Derbyshire, where we obtained a very large current of air. It was invented by Monsieur Guibel, a foreigner; and then there is another invented by Mr. Rammel, of this town. He is a man who is using pneumatic pressure for underground conveyance of parcels and goods, and so on; that is another fan. Then in Wales they have a huge pump; that is a pump invented by a gentleman named Struvé; he pumps out enormous quantities of air. Then there is another man at the Mountain Ash Colliery who has a huge machine like a great box, vibrating backwards and forwards; but the end of it all is that I should advise a simple fan of some kind.

3945. But the plan provided by this Bill of simply natural ventilation, you conceive to be ineffectual?—Natural ventilation is ineffectual and unsafe.

3946. Then when you talk of a fan, I suppose there must be some motive power or other to work it?—A steam engine.

3947. Then there is a steam engine to be provided to keep the fan in motion? —Yes.

3948. Of course that would be a source of constant expense; every steam engine is?—Yes.

3949. Would it require to be a steam engine in each subway?—No; the proper mode of doing it would be by centralising the ventilating forces, bringing them together, and then dividing the town into certain districts; but I have not gone into the particulars, bringing them into a central district, and having a sort of general establishment. You can call it a pumping establishment, or an exhausting establishment, and then have these large subways all converging to certain points, and there have the fans established. The products of the ventilation thrown off must be thrown off through a high chimney shaft.

3950. The proposed subways being isolated, it would be necessary to use a separate steam engine for each existing subway, would it not, there being no connected system?—If it is proposed not to extend the subways beyond what I have now seen, of course there must be separate ventilating power; but I thought this was only a specimen of what was to be done.

3951. You speak of the lateral passages and the probability of the gas collecting in those lateral passages; how would you ventilate them, by a fan, by brattices, or how?—In every case where I could I should introduce a small orifice running into the premises to which they lead, so as to have an intake current of air;

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air; a small hole let into the cellar, which would permit the air to go in, and completely ventilate that passage.

3952. From the house to the passage, or from the passage to the house?—From the house to the passage, which I contend would be an advantage, inasmuch as it would take away all the smell arising from the cellar.

3953. But all this must entirely depend upon what?—It would entirely depend upon adequate ventilation.

3954. Supposing this communication made with the house, what would be the effect of a fan, would it draw it from the house to the passage, or from the passage to the house?—It would draw it from the house to the passage; it would draw the air out of the passage, and drive it up the chimney, which I mentioned, or the stack, and I believe it would remove all sorts of smells that might arise.

3955. You speak of a chimney; what sort of chimney do you propose?—An ordinary chimney shaft; I have not gone into the calculation, but perhaps 200 or 300 feet high, and 10 or 12 feet in diameter.

3956. You say a chimney of 200 or 300 feet high?—According to what is required; that high chimney is merely for the sake of throwing off this bad air into the atmosphere, and thus allowing it to be mixed and blown off.

3957. How many of such chimneys would it require to 100 yards of subway, and what sort of chimney would you require?—I should not want more than one chimney for some miles of subway.

3958. But so long as the subways are isolated, and do not consist of some miles, would not you require some sort of chimney to every one?—You would require a chimney to every exhausting establishment. I said that the subways should converge towards one centre, to be fixed upon, and an exhausting establishment put up at some convenient point in the City, and then have the vitiated air all brought to that one point and thrown up that one chimney.

3959. Supposing that you are dealing with one isolated subway, which you say requires to be artificially ventilated, you would require one pumping establishment for that one isolated subway, would not you?—Yes.

3960. And one chimney shaft?—Yes.

Cross-examined by Mr. *Cripps.*

3961. I have only one or two questions to ask, that I may quite understand what you have said. The whole of this matter seems to be a question of ventilation, does not it?—I think so.

3962. And with proper ventilation there would not only be no danger, but there would not even be any smell?—No.

3963. For proper ventilation there have been a great number of inventions recently; and probably there would be new inventions coming out constantly, from time to time?—Inventions for ventilation to generate power.

3964. Mechanical science is constantly getting something additional in that respect, is it not?—Yes; all people interested in ventilation are working at it as hard as they can every day; we all are.

Re-examined by Mr. *Richards.*

3965. You say that it is a question of ventilation; but having established this artificial ventilation, would the gratings which now exist still be kept open.

Mr. *Cripps* objected to the question as not arising out of the cross-examination.

Chairman (to Mr. *Richards*).] You can put it through me, if you like.

3966. Mr. *Richards.*] I would ask the question, whether with this artificial system of ventilation that you are suggesting, all these subways now existing would be left open?—Some gratings would be necessary; it would be convenient to have a supply of air at different points; not to bring in the whole current of air at the extreme point, but to bring it in at certain points, which must be

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be determined when a complete plan is laid out as a whole; some gratings would be retained, no doubt, and some would be rendered unnecessary, but I cannot say as to that without going into the whole details.

3967. Mr. *Jackson.*] But if a perfect and improved system of ventilation were accomplished, do you think there would be any danger in laying gas pipes there?—I do not think there would be.

3968. You are of opinion that a system of ventilation can be accomplished which would be effectual?—Yes; but I must say this; on no consideration let this matter be attempted with nothing but the present imperfect natural ventilation; that would be a most dangerous thing.

3969. Mr. *Bagwell.*] Are you aware that in the lateral chambers there is an opening under the kerbstone in each street?—In the subway?

3970. Yes?—Yes.

3971. The subway is lighted and ventilated, or supposed to be, from the top, and at each one of those lateral chambers there is a small ventilation to the kerbstone?—I do not know whether there is to each.

3972. There are openings to all?—I see one at the side of that plan without one; there are a good many of them.

3973. Supposing that each lateral chamber had an opening under the kerbstone, do not you think that that form of ventilation from the main shaft, the wind coming in there, would clear the lateral shafts through the openings under the kerbstone?—It would, to a certain extent, remedy the evil, but not entirely so; because, as I said in the commencement of my examination, the want of an active state of ventilation would not by that mode be remedied; the air would every now and then be in a stationary condition, and an accumulation of gas above would take place in the side passage notwithstanding those openings.

3974. We will suppose a room with only one window in it, and no chimney in it, merely with one door, and one window; do you think there would be any danger of an explosion of gas, supposing there was a hole under the door, and another hole at the top of the window?—I think there would.

3975. You think there would?—Yes.

3976. Then we must be living in a frightful state?—I think you are living in a much more dangerous state than you are aware of; there are a great many more accidents take place than we hear of.

3977. We do not hear of private houses being blown up?—You hear of explosions in cellars and other places, and there are many that you do not hear of; one occurred in a gas works that I myself am interested in; in the case of gas supplied to a house by the gas company, there was a certain leakage took place in a cellar which had a grating open to the street, and a door; and there was an accumulation of gas in consequence of that leakage upon the roof of the cellar in that part which was not swept by any current. The persons repairing the pipes went in in order to examine it, and took a lighted candle with them. The consequence was, that the gas exploded, and knocked the windows out, and burnt the people. That is an instance that was not published in the newspapers. The gas company paid a sum of money for the act of their servants, and there was an end of it.

3978. What would you do in case you did not want to take a lighted candle in, and you had no safety lamp with you; what precautions should you take if you thought there was an accumulation of gas in a cellar?—The first precaution would be, certainly, to see that all the lights were out about the house, and then to open the doors and windows, and provide some kind of fan by a cloth, or anything else, to buffet the atmosphere, and drive the gas forth; it is a very simple thing.

3979. Mr. *Duff.*] Do you think that if by artificial means the subway was kept at a higher temperature than the external air, that would ventilate the subway?—If the subway were artificially kept at a higher temperature than the air in the street, and you had a sufficient height of chimney shaft to carry it off, it would ventilate the subway.

3980. But you think would not be the case with the present state of ventilation?—No; it is uncertain; there can be no artificial heat generated within the subways beyond the natural temperature of the materials in the earth, of which it is constructed, without a furnace or a fire of some sort, and then there must be a shaft to carry off the rarified air; of course that would promote a current. If

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If the chimney shaft were erected at the end of any of these subways, that would promote a certain amount of ventilation, but very inadequate.

3981. *Chairman.*] Did you see the great masses of lamps that there are at each end of the subway; perhaps you did not notice them?—In the subway, do you mean?

3982. In the street?—I saw there were a number of gas lamps.

3983. And there was a shaft besides, from which the lamps were suspended? —I did not see that.

3984. There is a shaft which goes up with a great mass of lamps, which is a means of heating the air at the top?—I daresay it would do so.

3985. As far as that went it would be useful, *pro tanto?*—Yes; *pro tanto.*

3986. Mr. *Floyer.*] You are decidedly of opinion that the gas would not, by its own natural tendency to rise, pass off through the apertures without an active current of air passing through the ventilators?—As long as there is any current, and the gas, which is very light, be disturbed, it may pass out; but unless there is some kind of current I think it will not pass out; of course I am speaking with reference to leakages and extraordinary circumstances; accidents only arise from a concurrence of circumstances; in this case it is a leakage of pipes, a leakage from the pipes arising from causes which a gas engineer can tell you much better about than I can.

3987. Gas has a natural tendency to rise?—Constantly.

3988. That circumstance would not be sufficient to carry it from these passages, along the roof, to the openings, and so carry it out to the open air?—Not without a current; we find that continually occurring in coal mines.

3989. There are no openings, except the shaft, in coal mines, by which it could pass off?—No.

3990. *Chairman.*] With regard to an escape of gas, is it your opinion that with pipes laid in a subway, with the care and inspection, and so on, which has been suggested by some of the witnesses, that an accident by an escape of gas from the joints would be common or uncommon?—I cannot tell, because that would depend entirely upon the discipline maintained and the way in which those things were managed.

3991. My question rather is, whether a pipe laid in a subway would be more likely to be kept sound than a pipe laid in the street, and subject to all the accidents incident to the streets?—I think a pipe laid in a subway would be more likely to be kept sound and secure.

3992. From what cause do you expect the gas to escape; from small leakings?—Accidents will arise from the carelessness of workmen or mischievous persons; it appears to me, that without some regulation of a very strict character, indeed, all these subways would be open for people to go into them and commit mischief.

3993. You see how they are entered now by those doors?—Yes.

3994. Would there be any difficulty in securing the entrance by means of those doors?—Certainly not; but I think there must be a system of surveillance beyond what we see, and separation gates put in under certain conditions, to prevent men from going through; I have not seen very much of the discipline of the working classes, but it appears to me to be not very great in London; they seem to do pretty well what they please.

3995. There would be no great difficulty in establishing a code of regulations called bye-laws of the company, to secure all that in a reasonable way?—Not the slightest.

[The Witness withdrew.

Frederick Joseph Bramwell, Esq., re-called.

F. J. Bramwell, Esq.

3996. Mr. *Bagwell.*] WHAT system of ventilation is there in the subway which runs out of the Place Napoleon Trois, in Paris; it was stated to us to be about half a mile long?—There are openings into the lamp posts which I believe afford a little outlet for the air; those lamp posts are used for the watercocks as well as for the gas, and I think there is also an outlet into the air; there are also the places by which you go down, but my recollection is, that the covers which are ordinarily upon those openings where you descend, are solid plated covers with merely small holes in them for lifting them; that is my recollection.

3997. There is no ventilating shaft, such as has been recommended by the last

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last witness?—Certainly not; that I am quite clear about, the only thing that I am in doubt about is, as to the nature of the coverings of those holes, and as to what amount of open work there is in those coverings; I should like to refer to my pocket book before answering that positively.

3998. Mr. *Grove*.] Are there no openings such as those in Southwark-street, upon the crown of the arch?—There are, but I do not remember distinctly whether they are covered by a grating, or whether they are covered with a solid plate having only one small hole for the purpose of lifting.

3999. Then the subway is dark, I presume?—It is dark.

4000. *Chairman*.] Were you in it?—I have been in it twice.

4001. How large is it?—I believe it is about 6 feet high and 3 feet wide.

4002. Mr. *Richards*.] What subway is this?—The Place Napoleon Trois (*after an interval, the Witness having referred to his papers*); I said I did not know whether the coverings to the openings in the Place Napoleon Trois were solid plates with a small hole, or whether they were open work; I have referred to my book, and I find it stated to be "ornamental coverings every 30 metres," they are just the same distance apart as those in Southwark-street, 100 feet.

[The Witness withdrew.

James Simpson, Esq., called; Examined by Mr. *Richards*.

J. Simpson, Esq

4003. I believe you are a Civil Engineer, of many years' standing?—Yes.

4004. You are engineer to the Chelsea Waterworks Company, and the Lambeth Waterworks Company, amongst the metropolitan companies, and several other waterworks companies in various parts of the Kingdom?—Yes.

4005. And you have had large experience in all matters connected with the supply of water?—Yes.

4006. You were examined, I think, before the Committee in the year 1864?—Yes.

4007. Has the present Bill also been under your consideration?—Yes.

4008. Are you aware of the extent of the existing subways, and also of the amount of certain subways that are to be constructed hereafter?—Yes.

4009. Have you also had your attention called to the arbitration clauses?—Yes.

4010. Have you yourself acted as arbitrator frequently?—I have had a very extensive practice as an arbitrator.

4011. With regard to these arbitration clauses, what is your opinion of them—

Mr. *Cripps* objected that the question was not one for the opinion of a civil engineer.

After some discussion,

Mr. *Richards* stated that he would put the question in another form.

4012. Mr. *Richards* (to the *Witness*).] From the experience that you have had as an arbitrator in matters connected with waterworks, do you think it is desirable or reasonable that the companies should have to go to arbitration every time they are called upon to move a pipe in a subway, or take it out of a subway?—No, I do not; I am satisfied that it would be not only a very unsatisfactory way of doing it, but that it would be a most expensive, and most tedious way.

Chairman.] Is that likely to arise?

Mr. *Richards*.] Very likely indeed, if I read the Bill aright.

Chairman.] Between two public bodies.

Mr. *Richards*.] Between the companies and the Board of Works.

Chairman.] Whenever they propose to move a pipe, you say.

4013. Mr. *Richards*.] Not whenever, but it would be very frequent indeed, at least we think so. (To the *Witness*.) As to the cost of arbitration, have you

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observed in the Bill that the costs of arbitration are provided for?—I think not.

4014. Supposing you saw your way to any advantage to the public or the companies in these subways, do you start disposed fairly to consider the question?—Certainly I should; I should be very glad to see a thing of the kind if I thought it practicable.

4015. You would be very glad to see a thing of the kind carried out if you thought it could be carried out?—Yes, with reasonable expense.

4016. Looking to expense, and difficulty, and danger?—Yes.

4017. Do you think that obstacles insuperable arise?—I do.

Chairman.] What is the danger?

Mr. *Richards.*] The danger is from explosion of gas.

Chairman.] This gentleman is not a gas engineer.

4018. Mr. *Richards.*] No, he is not; he is a water engineer. (To the *Witness.*) I daresay, as a water engineer, you have had a good deal to do with gas pipes?—I have.

4019. Do you find, from your experience as a water engineer, that gas pipes in the neighbourhood of water pipes do, in point of fact, not unfrequently leak?—Yes.

4020. Do you believe it to be possible to keep gas pipes absolutely and entirely free from leakage?—It has not been so as the result of my experience; and, unfortunately, it is a very long time before we discovered it, even in places where you would suppose we could discover it quickly.

4021. Does your experience tell you that pipes which may be watertight may not be gastight?—Yes.

4022. I need hardly ask you, if there should be leakage in these subways, do you apprehend that there will be risk of damage from explosion?—I do. It is talked very offhand about introducing ventilation. Now ventilation, allow me to observe, is a very difficult subject; it is one in which I do not profess to be anything more than an amateur; but it is one which I have had under my practical knowledge for 40 years, and I know the difficulty attending it; it is said, "Oh, put a shaft up, and heat it in some way, and you will ventilate the subway." Now that has been tried in London, at Knight's Soapworks, in Lambeth; they connected the sewer with their steam engine furnace; it was rather a remarkable case; the connection was made early in the morning, and that went on until the gas pressure increased towards four or five o'clock in the afternoon, when the explosive mixture no doubt got to a sufficient height, and an explosion took place, and blew a portion of the boiler furnace down.

4023. *Chairman.*] Was the gas escaping?—Yes.

4024. Did you examine it?—Yes; when I say "escaping," it was smelt at the sewer, and, as we all know, a large portion of the ground in the metropolis is saturated with gas, and you cannot open the ground anywhere but you find a quantity of gas in the soil, and the earth discoloured; so much so that you can always tell the difference between the earth round a gas pipe and the earth round a water pipe.

4025. By the earth around it?—Yes; by the black earth around it.

4026. And by the pure earth round the water pipe?—Yes.

4027. Mr. *Richards.*] Do you attribute the leakage entirely to leakage at the joints of the gas pipes?—I believe it was the general leakage of the district which found its way to the sewer, and when the pressure came on sufficient to supply gas enough to make an explosive mixture in the atmosphere of the sewer, then the explosion took place.

4028. You speak of the earth being black and discoloured in the neighbourhood of gas pipes, so that you can distinguish the earth about the gas pipes from the earth about the water pipes. Do you consider that the leakage which so discolours the earth generally in the streets proceeds entirely from the joints, or from the porocity of the iron along the whole length of the pipe?—It is something more than the porocity of the iron; in the manufacture of cast-iron pipes, they are sometimes carelessly put on damp sand, and then you get porous metal. In the manufacture of a large quantity of pipes they cannot be very particular, and we know that they come up in a variety of states, so that they are not always so sound as they ought to be.

4029. *Chairman.*] Are they proved?—Yes, they are proved; but then the pressure is kept on for so short a time, that the proof is not of any great value.

4030. Do you know that as regards gas pipes?—Yes; I have frequently been engaged in examining pipes, in testing gas pipes; and I know, from an extensive practice in examining gas pipes, that they are frequently defective.

4031. Mr. *Richards.*] Gas pipes are tested, I apprehend, under hydraulic pressure much heavier than the pressure of the gas to which they are afterwards subjected?—Yes.

4032. But they are only tested in that manner necessarily for a short time?—You could not do it to a greater extent, it would occupy too much time; you just get the pressure up and let it remain for two or three minutes, and then let it off again; it literally proves nothing but that they are just watertight, and no more.

4033. It shows that they are watertight, and then they are hammered in that position, I apprehend?—Sometimes they are, and sometimes not. For myself, as regards proof, I disapprove of hammering, because I think it does a great deal of mischief. We know very well that a 35 lbs. weight hammer falling 5 feet will coin a shilling, but that it will take about 32 tons of direct pressure to do the same thing.

4034. Notwithstanding that proof to which the gas pipes are put, does your experience tell you that constant presence of gas does nevertheless force the gas through the pores of the iron in course of time?—Gas is a very subtle fluid; it is not exactly the pressure, because the pressure is comparatively small, only a few inches of water, but we do know that, independent of leakage of joints, we frequently have leaks from defective pipes. The very fact of moving cast-iron pipes is to be viewed with apprehension, because they are only a remove from glass bottles, and very slight blows would injure them and crack them, and the gas would go through the cracks.

4035. Do you believe that the greatest care and precaution in laying down pipes, can prevent those leakages partially through the joints, and partially through the pores of the metal?—No; I have known cases where great care has been taken, and still there has been a great escape of gas. A remarkable thing occurred some years ago to me at Windsor Castle: I was then constructing waterworks there, they laid gas all over the Castle, and I thought it very well done, but the smell of gas in the quadrangle was so great that I was called in and consulted, and we examined it, and we found the gas escaping not only from the joints but from the pipes, and the whole of the pipes were taken up and again relaid; in fact, the architect had so little confidence in the parties who had done the gas that he said they were not competent, and he would have them done by the men who laid the water pipes, and the men I employed did all the work.

4036. Viscount *Galway.*] Has there been any escape of gas since?—No; there has not, only the ordinary escapes.

4037. Mr. *Richards.*] What do you mean by "the ordinary escapes"?—Every now and then some sinking of the ground takes place, and disarranges the joints.

4038. *Chairman.*] Breaks the joints?—Yes.

4039. Mr. *Richards.*] Of course if any escape of this sort, through either the joints or the pores of the metal, takes place, it must mix with the air in the subways, and produce an explosive mixture?—Yes.

4040. Now as to the form the gas would take in the subway, would it rise, as has been suggested, to the top of the arch, and so pass away in your judgment, or would it mix generally with the surrounding air, and depend upon the condition of the atmosphere as to whether or not it was carried away?—It would depend entirely upon the state of the atmosphere; if you had a sluggish atmosphere it would not move at all. I have had considerable experience on that subject, in Parliament-street; after the sewer was made there, the explosions in Parliament-street, in the vaults, were continual, and they were open to the air.

4041. *Chairman.*] What vaults?—The vaults of the houses; the coal cellars.

4042. Mr. *Richards.*] The coal cellars of the houses in Parliament-street?—Yes; I have seen that frequently the case: at Mr. Pollard's, at Brompton, two years ago, an extensive leakage took place, and the company were months before they discovered it; they were looking in the street for the escape: the water was contaminated

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contaminated day after day, and that occurred in a small building out in the scullery, and the gas there was entirely conveyed to the building through the water pipe. First of all, when the water was turned off in the streets, the pipes inhaled the gas from the surrounding earth, and when the water was turned on the next day it expelled the gas, owing to its being a lighter fluid, and delivered it into that place. One of the Chelsea Company's turncocks went in with a light, determined to discover it; he discovered it by his hair being burnt off.

4043. Is it within your experience that gas is discharged through the water pipes into the cisterns of the houses occasionally, and there explodes from light being applied to it?—I have seen it a hundred times.

4044. You speak of those explosions that took place in Parliament-street; that was after the construction of the sewer?—Yes.

4045. Were the gas pipes affected by the construction of the sewer?—The ground sunk, and the steps of the houses, and the backs of the vaults, were drawn away; the pipes were drawn out of the gas companies' pipes in the streets, and very extensive leakages took place.

4046. *Chairman.*] Into the vaults?—Into the vaults; that was one of the points of escape, and where the accumulations took place; and many servant girls at that time were burnt; that was going on for two months.

4047. Viscount *Galway.*] How long ago was that?—Twelve years ago.

4048. Mr. *Richards.*] These vaults were vaults in the areas, were they?—They were.

4049. Communicating with the open air in the area?—Yes; some of them did; some of them had doors to them, and some none; Parliament-street may be an extreme case; that represents the number of pipes in Parliament-street (*exhibiting a diagram*); a few more have been laid since that drawing was made; these are gas, and these are water. (*The Witness explained the diagram to the Committee.*)

4050. *Chairman.*] You say that case in Parliament-street is an extreme case?—There would be many of them found in the metropolis.

4051. Mr. *Richards.*] You have described the way in which the gas escaped into those vaults in Parliament-street; do you think that, even supposing the gas pipes were excluded from the subways, there would be a risk of gas escaping into the subways in the same way as it did into the vaults?—Yes; the proposed ventilation would have the effect to some extent, that it would draw the gas in from the whole of the surrounding soil, and no doubt that will go on for a great length of time.

4052. *Chairman.*] Not through the brickwork?—Yes; through the brickwork; they are not tight.

4053. Through the brickwork of the subway?—Yes.

4054. Mr. *Richards.*] Do you conceive, as a practical man, that it would be possible to carry on the works proposed to be carried on in these subways without the use of a light in them?—I think not.

4055. We have been told something about reflected light, and so on; do you conceive it possible to carry works on without a light?—I have tried to work with a reflected light, and I could not do it to any great extent.

4056. With regard to melting lead, supposing the lead to be melted outside the subway, if you like, do you still apprehend any danger by taking the molten lead into the subway, supposing explosive mixture to exist there?—I think in the hands of the usual workmen, to whom these things are left, you would be sure to have an explosion.

4057. Even with careful inspection, do not you find the men so careless as that it is impossible to avoid accidents at all times?—It is totally impossible to avoid accidents; caution the men as you will, stand by them, and do whatever you can, you cannot make that class of men careful.

4058. The last gentleman spoke of accidents which nobody hears of, does your experience tell you, that there are many accidents occurring from explosions in sewers?—I have been constantly hearing of them.

4059. That is to say, gas which has come in through the brickwork of the sewer?—Yes.

4060. Found its way in there from the soil?—Yes.

4061. Do you see any reason, supposing the gas pipes to be outside the subway, why the subway should be more clear than the sewer?—No; founded upon the case of Westmoreland-street, there was no gas pipe in that street, and yet a very serious explosion took place here; at least not an explosion, but the gas got in, and killed the men.

4062. *Chairman.*] Choked them you mean?—Yes.

4063. Was it clear that that came from an escape of gas, or from generation of gas?—My own impression was, that it was gas from some soil that had been brought there and filled in.

4064. Mr. *Richards.*] Now, we shall be told that those subways differ materially from the sewers with respect to their ventilation; are you of opinion that the ventilation of those subways is sufficient to avoid the risk of explosion, of which you speak?—The subways as constructed at present are not, the parties who have constructed these subways (if they will excuse my saying it), require more knowledge and practice upon the subject of ventilation; it is a very difficult subject, and even mining engineers with their great experience, sometimes fail.

4065. There is nothing to produce a constant current, is there?—No; there is not; if you imagine by putting air in you will promote the mixture, you will very often fail in that, and when you imagine that you have ventilation and air coming in at the bottom of a place, and going out at the top, the draught may be direct, and you may have no mixture at all.

4066. If the defect of ventilation be true of a single individual isolated subway, would it not be equally true when you come to an extended system of subways?—Yes.

4067. With regard to the side passages to the houses; what do you say to them?—I think they would be just pockets full of gas; you would have extreme difficulty to keep the gas from collecting there; you want some special ventilation for them as well.

4068. I understand that you are distinctly and strongly opposed to the introduction of gas pipes into subways?—I am.

4069. Supposing gas pipes not to be introduced into subways, and to be laid at the outside, you would still have the breaking up of the streets by the gas pipes as you have at the present time?—Yes.

4070. So that the saving would be confined to the water pipes?—I think it would not be worth doing, because you will not get rid of all the openings; you will have the superficial openings of the plugs and cocks, and a variety of things which you would have to attend to on the surface; in macadamised streets especially there are constant repairs.

4071. *Chairman.*] Constant repairs?—Constant repairs.

4072. Why?—They are continually liable to be deranged.

4073. But my question is, why more in a macadamised street than in a paved street?—It is a looser material, and the wear is greater.

4074. Mr. *Richards.*] Do you mean that the pipes suffer more in a macadamised street than they do in a paved street?—The plug-boxes, and cock-boxes, and everything which is exposed in a macadamised street require greater alteration than they do in a paved street; the repairs are not very large, and most of them are done before nine o'clock in the morning; but still they require constant attention; If we suppose that we are going to get rid, in the subways, of all the superficial openings; it is quite a mistake; there are a great many things to do that we shall not be able to do in a subway.

4075. Matters connected with the surface?—Yes; if you want water to supply a fire, for instance, you must go to the surface, you cannot go into the subways.

4076. Do you consider that the gas or the water pipes occasion the greatest amount of openings in a street?—My own opinion is, that gas pipes occasion considerably more than the water pipes.

4077. Your opinion is, that the disturbance to the surface cannot be entirely avoided, even with the use of pipes which are introduced into the subways?—No.

4078. The water pipes, for instance?—Yes.

4079. Supposing gas pipes to be excluded, and water pipes inserted in the subways, what do you say to the necessity for gas pipes crossing the streets in which subways exist, crossing them at right angles?—Assuming that the subway is low enough, then the gas pipes would cross without any obstruction or difficulty, but if they are near the surface there would be great difficulty.

4080. The risk you imagine of an escape into the subway from the gas pipe above, *J. Simpson.* Esq.

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above, would be considerable?—Yes; we find in laying pipes in the metropolis, that it is well to lay them on one uniform bed; for instance, if a pipe is laid partly on a wall and partly on the ground that pipe will break, and numerous cases of that kind are occurring.

4081. Do you find that the water in the pipes is apt to be contaminated by the gas?—Yes; such things do occasionally occur.

4082. *Chairman.*] Often?—They occur in this way; if the water is turned on in a street for the service and then for repairs it is turned off again, it drains to the lowest point, and it then inhales the gas which surrounds the pipes from the contiguous gas pipes, and when the water is turned on again, the gas is expelled and mixed.

4083. *Chairman.*] That is a possible case, but does it occur often?—Very often; it is one of the most common cases we have I should say, it occurs at least every fortnight.

4084. Mr. *Jackson.*] Would it occur if the patent machine for tapping was used; Mr. Upwards' machine, have you seen that?—It occurs from the imperfect joints, I do not think that that would vary it at all.

4085. There would be no necessity to turn the water or the gas off in using that instrument?—You must have it turned off occasionally.

4086. According to the evidence, there is no necessity for turning off the water?—I believe there is a necessity, but we find practically that you cannot keep the water on from year's end to year's end.

4087. Mr. *Richards.*] Do I understand you to speak of the contamination of water by gas; does the water suffer contamination at any time from the foul air of the sewer?—We do not distinguish between the two, there is no doubt that water would suffer from it if it were in a position to do so; water is a very delicate thing, if you put a pail of water in a room that has been fresh painted, you will find a blue oil come on that water in a few hours.

4088. In regard to the size of the subways, do you know the size of the Southwark-street one?—Yes.

4089. In your judgment, would a subway of that size be sufficient to accommodate the pipes in any large thoroughfare in London?—No; I look upon it that the subways must be adapted to the number and size of the pipes that will be required; they will vary in almost every street; in some cases they will be wanting 15 or 16 lines of pipes, and in others less.

4090. But in a large leading thoroughfare would it not be the case, where you find the most pipes, that you would require the largest and most capacious subways?—Yes; in leading thoroughfares generally, the large pipes are laid; most of the pipes that go from one district to another.

4091. We have had evidence with reference to the mode of connecting pipes laid in subways with pipes going into the lateral streets?—That is a difficulty; in fact the whole thing wants to be studied; at present it is somewhat of a puzzle even to me to know how that can be done; but I can readily imagine, by persevering time after time, and studying different things, that something of the kind may be arrived at, but it is not to be done at once; it is a very serious thing the intersection of streets; you have to go to different levels; and as regards the gas pipes meeting in that way it would require a great deal of study; you cannot take gas pipes jumping up and down to various levels.

4092. Would not the doing of that involve a very great deal of extra expense?—No doubt it would; when we pay 6 *l.* a ton for ordinary pipes, we pay for special castings 9 *l.* a ton, and intricate and difficult castings of pipes would cost more.

4093. Would not the intersection by these cross streets of the principal streets where the subway exists cause the subway to be completely blocked up?—I think it would; it would be a piece of ingenuity to construct all these pipes in these subways, considerable ingenuity; a man must have some experience to do it.

4094. The communication pipes, of course, will have to cross each other, will they not?—Where you have only one service in a street.

4095. I have spoken to you about the pipes in the streets, with a subway crossing streets where there are no subways; but how about where two subways meet; do you apprehend any difficulty thereby by the rectangular intersections?—That is where the difficulty will occur; you must alter the level of it to get the pipes past each other. I can only say that I have studied the thing, and I consider it difficult; I do not say that it is impossible; if it were to come in that direction, you must either dip the pipe underneath or over that, and in the case of gas of course it would lead to a syphon; you cannot go to different levels without syphons.

4096. Without the slightest disparagement to Mr. Bazalgette, or any other engineer, your experience is as large as that of any man in England, is it not, in laying water pipes?—I believe so; I have had thousands of miles of pipes laid under my superintendence.

4097. With regard to the necessity for constant inspection in the subways, watching, the police of the subway; what do you say to that?—I think they would require very great attention; if I were engineer to the company, I should not be satisfied or content unless our own men went into them every two or three days.

4098. And the gas company the same, I suppose?—Yes.

4099. And the telegraph company, or any other company, the same?—Yes.

Chairman.] Not the Telegraph Company.

4100. Mr. *Richards.*] At all events, the gas company and the water company?—Yes.

4101. All that, of course, involves extra expence?—Yes; and there is one thing in it; in the case of an escape of gas, my opinion is that we shall not always be able to get into those subways.

4102. Not be able to get into them?—No; upon an accumulation of gas, the question is, how to drive it out; it cannot be done very quickly.

4103. Do you think that the workmen and inspectors, and so on, would hesitate to go in?—I do.

4104. Do you know at all what is the extent of the pipes of the two companies; that is the Chelsea Company and the Lambeth Company; they have some 450 miles of pipe, have they not, the two together?—Rather more than that.

4105. That makes the pipes of the gas and water companies of London amount to some thousands of miles, does not it, altogether?—Yes.

4106. Do you know what the extent of the subways, proposed under this Bill, is?—Very short; very trifling.

4107. Is it not very short, compared with the immense number of pipes in London?—To subway all London would come to upwards of 1,300 miles; I apprehend that they would never think of doing anything of the kind.

4108. In all those districts where the subways do not exist, the breaking up of the streets must of necessity continue as it is, must not it?—Yes.

4109. Have you calculated, at all, the cost of the subways per mile?—I have made an estimate of it.

4110. What do you calculate it at; the engineer of the Board himself, put them at something like 16,000 *l.* a mile?—That was his estimate, and I thought it too low; I made my own estimate come to 25,000 *l.* a mile: but, supposing it could be done at 20,000 *l.* a mile, it would be an enormous expense to put subways into the leading thoroughfares of London alone; it is a question of ten millions of money.

4111. Then the proposed subways, in your judgment, would not relieve the metropolis from the necessity of having the streets broken up to any appreciable extent?—Yes; and then I do not admit that when you have got subways you would be able to prevent the breaking up of the streets; you would still have a good deal of breaking up, and as the town increases, you would want more pipes laid, and you would want the subways enlarged.

4112. Mr. *Jackson.*] That would depend upon where the supply of gas was to come from?—The pipes must go through the leading thoroughfares.

4113. Not if the town were districted?—Hitherto it has been found that the only way is to take them through the leading streets; I do not believe you will alter that; you must, to get them to the various points, pursue that course.

4114. Mr. *Richards.*] Something was said yesterday about the hydrants being diminished in size?—Yes.

4115. Are the diminished hydrants or the valves fit for your purposes in London?—No.

4116. Will you look at this (*handing a diagram to the Witness*); this, I believe, Mr.

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Mr. Hawksley had yesterday?—These are the ordinary cocks used in London.

4117. Are they such cocks as it might be necessary to have in a subway if you had the water pipes there?—There is no doubt considerable difficulty would be experienced in introducing those; if you put them at the end of a street, you must make the subway accordingly.

4118. *Chairman.*] It is suggested that there should be a chamber at the end of the street in which the operation might be carried on?—You could not diminish the size of them if you had got the same area for distribution; you may have different mains.

4119. Mr. *Richards.*] Did you hear what Mr. Hawksley said with reference to this yesterday?—I did.

4120. Do you agree with him?—I do.

Cross-examined by Mr. *Cripps.*

4121. I will not cross-examine you as to whether you heard Mr. Hawksley, but I think it is rather a slip of a word, when you say that you heard Mr. Hawksley's evidence?—I was sitting behind.

4122. I ask you whether you heard it?—I think I was in the room the whole time.

4123. Did you hear Mr. Hawksley's evidence?—I did.

4124. First of all, as to what you state about the alteration of these subways; supposing yourself to be the engineer who was employed to construct such a work as a subway, would not the first thing you would require be to be informed how much space you would want, and what the use of the subway would be, and then to construct it accordingly?—Yes, making such allowances for future increase as in my judgment I thought would be required.

4125. That would give you a different sized subway, according to the street in which you were constructing it?—Yes.

4126. That is to say some streets at present contain a great number more mains of gas and water than other streets do?—Yes.

4127. And the number of mains contained in those streets would, making allowance for some future increase, be a pretty good guide as to what was required for those streets?—It would be some guide.

4128. As to those other difficulties about supervision and inspection, do you know the 11th clause of the Bill which is before the Committee?—I do.

4129. That the Board are to have the power of making bye-laws for regulating the use of the subways, some regulations, of course, would have to be made for the proper use of the subways when made, would they not?—I should think so.

4130. You told us, very truly, that you are an engineer of considerable experience, how many years have you been engaged in laying down pipes in the streets, some number of years, I suppose?—Yes, I may say that I began as a pipe layer, I think, in 1814; I laid something like five miles.

4131. You do not like a change; you do not like new proposals, that is quite evident?—Really I do not think that you ought to say that; I do not think that any man in my profession would say that I do not like change, because I believe I have made as many changes as anybody; in fact, a great many of the things that have been introduced into waterworks themselves have been from my own designs.

4132. During the whole time that you have been concerned in laying down these pipes in the streets, have not you felt the mode in which it is done in proximity to the gas pipes a constant source of difficulty?—When you say "a constant source of difficulty," that is from the leakage.

4133. If I am correct, has it not been your experience which you state has been upwards of 35 years, that you have had to contend with difficulties arising from the leakage of gas?—Yes.

4134. That is under the system that we have at present, that you have had those difficulties?—Yes, I remember that more than 35 years ago, in a house in Abingdon-street, I would not believe that the water was contaminated, and I drank some of it, and the consequence was that I had a most dreadful headache, which I did not recover from for some days.

4135. The surface of the ground is hard, is not it?—Yes.

4136. You frequently find that the gas is escaping under the ground, do not you?—Yes.

4137. Which you have no means of detecting?—No.

4138. That gas gets in contact with the water pipes, and does contaminate the water, I suppose?—Yes.

4139. All of which is a very great grievance to the consumers of water, and to you as an engineer, I suppose?—Yes.

4140. That is a thing which is of continual occurrence, more or less, is not it?—Yes.

4141. I daresay you know very well that, where you have not actually found contaminated water, if you take up the gas pipes you will find that a leakage, though perhaps very slight, has been going on at the joints?—Sometimes we do.

4142. It would be, I suppose you will admit, a most desirable thing to have the capability of discovering any escape of gas, however slight, immediately it occurs?—Yes; assuming that you would habitually discover it, which I do not admit in the subways; I believe we should have a great deal of trouble there.

4143. Let us give you what you wish to qualify your answer with; it would be a great advantage to be able to discover the slightest leakage of gas, however minute, as soon as it occurred, would it not?—I have yet to learn that we should do away with the whole of that, or indeed any material part, because even the men walking along the pipes would be liable to interfere with the existing services in the subway

4144. You told me this, that under the present system you cannot, and do not discover that leakage until the damage has taken place?—Yes.

4145. I say that anything which would enable you to discover it earlier would be an advantage, would it not?—Yes.

4146. You spoke of the porocity sometimes of the pipes, but the greater amount of leakage by far of gas takes place at the joints, does not it?—Well, I should say not; about equal.

4147. Do you mean that there would be as much leakage from the little pin holes or whatever you may call them, arising from the porocity of the pipes, as at the joints?—From the fracture of the pipes if the pipe has what we call a body blow in carriage, that pipe would never be so sound as it should be.

4148. Assume first of all, that the pipe could not always be perfect, and that sometimes there is something like porocity in it?—The pipe from the very moment of its leaving the mould in the foundry, is liable to injury.

4149. I ask you, assuming that you are correct about the pipe being porous, sometimes there is a very slight exudation through it; that at first would be very slight indeed, would it not?—Yes.

4150. It would only be the continuous transfusion through that pipe, which could bring any difficulty or danger, is not that so?—No; I apprehend it is constant from the first, unless you vary the pressure the gas does not increase the hole.

4151. It increases the quantity; first of all assuming a quantity that could come through a porous pipe not the joints, that in amount at first, would be very small, unless it were to go on for some length of time?—I apprehend that it begins at a fixed quantity according to the pressure, and goes on at that quantity.

4152. But would not it in the first instance, assuming that it were stopped when discovered, be very slight from such a cause as that?—Most of the leakages from fractures, we find are the accumulation of days; and unless you dig down to the gas pipe while there is a pressure upon the gas, you will not discover them; I can conceive that if you go into your subways in the morning, you would not discover the gas, but if you went towards the evening you would; recently I had an escape of gas in my own office, and I sent for the workmen and went myself; my people about me are all mechanics, and we were annoyed by that escape for a month before we discovered it.

4153. *Chairman.*] Where was it?—It happened to be behind the skirting.

4154. Mr. *Cripps.*] Out of sight?—Yes.

4155. In the same position as a gas pipe in the street is when covered over with the soil; you could not see it?—You could not see it.

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4156. You must be very familiar with all the causes that lead to the fracture of pipes; take an ordinary macadamised street, what is it that causes a fracture to make a leakage?—Being laid on hard and soft ground, and being laid near the surface, and in some thoroughfares where the heavy traffic from the railway comes, because of late years that has been a serious thing. Formerly we had perhaps two ton vans coming down the street at the rate of three or four miles an hour; we have now vans of six tons at six miles an hour. The concussion of them and the effect upon the street is much more serious than travelling with a less weight at a lower speed.

4157. Probably you would say at the present day, with the extensive traffic, that it is the traffic which is the main cause of the fractures?—I believe so.

4158. And so far as it is not the main cause the other causes are their being laid near the surface and upon an uneven bed?—Yes; and bad castings originally.

4159. You have had a great deal to do, no doubt, with the laying and relaying of pipes in streets with a good deal of traffic going on?—Yes.

4160. Are not you always pressed to get the work done as soon as possible, so as to restore the traffic; and do not you have to cover it up again as soon as you can?—Yes; but very few operations take more than twelve hours, and a great many of them are done before nine in the morning.

4161. From the exigency of the case you get on with the work as quickly as you can?—Yes.

4162. You work at night sometimes, I suppose?—Yes; very often.

4163. Now, just one question about Westmoreland-street; I do not quite understand; you spoke of an explosion in a sewer there, or some suffocation, in the sewer; that was not coal gas at all, was it?—There were no gas pipes in the street.

4164. Then how has it anything whatever to do with the present question?—Well, it has so far to do with it that, if you are going to make subways in the streets of London, where the soil is of a foul description, and you introduce a state of things there, by drawing out the air till it approaches a vacuum, no doubt you would admit the surrounding gases.

4165. It had nothing whatever to do with the gas explosions, as we are talking about them in this Committee?—No.

4166. Are you really apprehensive that, from the foul air in the sewers, you will have that same sort of foul air in an open subway?—I have no doubt but what you would.

4167. That is one of your objections to it?—Yes; I do not believe there is any vacant space in London from which you can keep out these gases, and prevent them from accumulating; that case in Westmoreland-street was a decided case of poisonous gas, and two men were killed; first, the man who went in was killed, and then the surgeon, who went in to assist him, was also killed.

4168. *Chairman.*] That happens in wells very often?—Yes.

4169. Mr. *Cripps.*] Did you see the case that happened in Westmoreland-street, or is it only hearsay?—I was there soon after it occurred.

4170. Did you see an accumulation there of some vegetables in the sewer?—Yes, I did; there were all sorts of things.

Chairman.] Most likely it was carbonic acid gas.

Mr. *Cripps.*] It had nothing to do with this question.

4171. *Chairman.*] The same as you have in a well?—There may be a difference of opinion about that; I had an opinion at the time, that was this, that it arose from the refuse actually from gasworks; for when they first opened the sewer there was an extremely strong gas; I do not believe that it was carbonic acid in that case, because I do not think that would accumulate so near the surface.

4172. Mr. *Cripps.*] Did you see the two men who were killed, so as to form an opinion of the cause of their death?—No; I am not a surgeon; I do not believe the chemists agreed amongst themselves; I heard Dr. Ure; I know there was a great row at the inquest at the time.

4173. I only wanted to see how far that bore upon this inquiry?—I do not believe it was due to one gas; I dare say that sulphuretted hydrogen had as much to do with it as anything else.

4174. *Chairman.*] Or carbonic acid gas ?—If carbonic acid gas collected in the subways, you would find it very difficult to get out; I have been in wells where I have felt pins and needles in my feet, and have found it difficult to get out.

4175. Do you think that is likely to occur in a subway ?—I do not know what may occur in a metropolis like this; with refuse and all sorts of vegetables going about, I would not be sure what would occur; in fact, I look upon this as an experiment, and those who put it forward know practically very little of the subject.

4176. Do you understand that diagram which is up there of the gas and water pipes at Vauxhall Cross ?—Yes.

4177. Is it the fact that some of those large mains are laid under the others ?—I think so.

4178. If anything went wrong with those under ones, you would have to remove the upper ones to get at them ?—Yes; unless you slung them up to get underneath.

4179. So you must anywhere where you have pipes over other pipes in a street ?—Yes.

4180. And the same way you cross other pipes ?—Yes.

4181. You spoke of the difficuly in joining pipes in subways with pipes out of subways, on account of the expense of the joints of the pipes, did not I understand you so ?—No.

Chairman.] That a bent pipe itself was very much more costly than a straight one?

4182. Mr *Cripps.*] I understand you to say, that a bent pipe would be necessary where there was a joint from a pipe in a subway to a pipe out of a subway ?—Yes.

4183. That cost, whatever it was, would have to be distributed over the whole length of the straight pipe, would it not ?—Yes; at least it would be charged to that particular job; it would go to increase the charge of the job. In the ordinary way in large mains, there is sometimes 10 per cent. of the irregular pipes in the whole work, and sometimes 15 per cent., and sometimes 20 per cent.

4184. It is done in that way ?—It is not done in that way, because it is charged separately; and it would be here, but we know that that is the proportion.

4185. The expense depends upon the length of the straight pipe ?—In the case of a subway we should have a larger proportion of more expensive pipe.

4186. Does it not occur, even when you have laid your pipes in the streets upon the horizontal plan, that you have to have curved pipes occasionally ?—Yes.

4187. The difference would be, that instead of putting the curved pipe horizontally, the curved pipe would be put vertically ?—Yes; what we call an S pipe.

4188. Now I have only one other question to ask you, as to a matter which seems to have alarmed you; you have been afraid of the expense of arbitration and legal proceedings every time you are called upon to move a pipe; is that your impression of the way in which the Act of Parliament leaves the matter ?—Yes.

4189. And it is upon that notion of that state of things that you have such an objection upon that ground ?—Arbitration would not be a speedy mode, and it would not be anything like an economical mode; in fact, I view it as a most unsatisfactory mode of proceeding for companies to be continually going to arbitration.

4190. Quite so; and you think they would have to go to arbitration every time they wanted to remove a pipe ?—Yes.

4191. Another objection, as I understand you, to arbitration is, that there is no provision for the costs of arbitration ?—I believe not; but I do not know.

4192. That was put to you by my learned friend, and you have adopted it ?—

Chairman.] Pardon me; I think you are now intruding upon a question that was objected to in the examination in chief.

Mr. *Cripps.*] If the question does not stand upon the notes, I am not entitled to put it.

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Chairman.] Your honourable opponent withdrew it, and I recommend you to do the same.

Mr. *Cripps.*] The Act provides for it.

Cross-examined by Mr. *Richards.*

4193. What you said about the arbitration was one of your objections, I understand?—Yes.

4194. You still abide by what you said with reference to the dangers of explosions, and so forth?—Yes.

4195. With regard to what you said about the sewer in Westmoreland-street, whether that arose from gas, or whatever cause it arose from, you say there was an accumulation of foul air in a confined space, and that such an accumulation might take place in the subways?—Yes; and very likely to take place.

4196. Do I understand you to say that most of your repairs are done before nine o'clock in the morning?—Yes; the smaller repairs are done before nine o'clock in the morning.

4197. It is rather suggested to you that you do them under pressure of time, and in a hurry, so that they are done inefficiently; is that so?—I believe that under the circumstances, they are as well done as men can do them. I can only say that the mode of laying pipes in the metropolis of late years has been very much improved.

4198. Mr. *Paull.*] There is only one question that occurs to me; you began to tell us something about the artificial ventilation that was established at Knight's Soapworks, where you stated, if I understood it right, that an explosion of gas took place, and that artificial ventilation had not been adequate to prevent it; something to that effect, but you were stopped in telling your story?—They drew ventilation from the sewer so long that it became an explosive mixture, and then the wall of the furnace was blown down.

4199. By means of artificial ventilation at the soapworks, the gas was drawn into the works from the sewer, I understand?—The sewer was extended and connected with the furnace of the steam engine.

4200. How did the artificial ventilation come into connection with the sewer?—It was a sewer extended and connected with the furnace, and then, when the furnace went to work, of course it drew the air from the sewer, and as it drew it in the afternoon, when the supply of gas became more abundant and the pressure increased, it drew a larger portion of gas, until it became an explosive mixture.

4201. It not only ventilated the place from the fumes of the furnace; but drew off the vapour from the sewer?—Yes.

4202. *Chairman.*] Where was the explosion; in the sewer, or in the furnace?—In the furnace.

4203. Viscount *Galway.*] The sewer then had never been inspected, or looked into?—It is the common sewer in the street; and if they had inspected it in the morning I apprehend they would not have found anything the matter; but towards the afternoon, when the pressure of gas increased, they got an explosive mixture, and an explosion occurred.

4204. It could not find an outlet?—There is the same thing all over London.

4205. *Chairman.*] In the soil, do you mean?—No; in the sewers.

4206. Mr. *Jackson.*] I understood you to say that there were no gas pipes in Westmoreland-street?—It was another part I spoke of; there were no gas pipes in Westmoreland street.

4207. Were there gas pipes, running parallel to this sewer, which supplied the air which blew up the furnace?—I conclude so; there is gas laid over that district, and the district is lighted with gas.

4208. Viscount *Galway.*] What subways, which are in the schedule here, would be used by the companies of which you are engineer?—A small portion of the Thames Embankment would be.

4209. *Chairman.*] Is that opposite here?—Yes; and then, of course, in any subways they may make.

4210. But in the subways now existing?—Not at present.

4211. Viscount *Galway.*] At present there is none but a portion of the

Thames Embankment?—None but a portion of the Thames Embankment; we have pipes as far as Northumberland House.

4212. *Chairman.*] You have no pipes that would interfere with the subway?—I cannot imagine that, in that portion of the Thames Embankment which the Chelsea Company supply, there would be anything required; at least, I do not know what the position is.

4213. Mr. *Jackson.*] You have stated very properly, that while the pipes are tried by hydraulic pressure at the works where they are cast, in the transit to where they are wanted, they are likely to get what may be termed a "body blow?"—Yes.

4214. And by that means get fractures or cracks, and the pipes not being tried again before they are put into their positions, they are apt to leak?—Yes; just allow me to remark, about five years since we had a quantity of 30-inch pipes coming from Stavely, I happened to be at Birmingham at the time that they were sent by railway (we have discovered that in sending pipes by railway, they get more fractures than they do by sea), and while I was there, four trucks of these 30-inch pipes, they were 9 feet long, very fine castings, came there; there had been some collision in going from line to line which smashed them up, and there was not a piece 3 feet long among them.

4215. That was a railway accident?—It was not a railway accident upon the line, it was something that occurred at the station.

4216. Have you never thought it prudent upon the part of the water companies, before you lay those great trunk water mains, to have them again tested?—We do sometimes; but unfortunately we cannot allow the test to remain long enough to become of any value. In practice I find this actually to be the case.

4217. Without reference to arbitration, or without reference to any cost, to any of the companies for the use of those subways, do you think that if those pipes were well laid in the subways after being properly tested, that there would be less liability to fracture or escapes than there would be in the streets, after you have stated that the streets are shaken by those heavy vans going at the rate of six miles an hour?—My own opinion is, that practically I do not think we should find any difference, there would no doubt, be some casualties occur in the subway.

4218. Do you mean that if the pipes were well laid, and well bedded, and satisfactorily placed, they would be as liable to get damaged, having no pressure upon them, and no vibration, as they would be laid in the streets?—I apprehend that the vibration goes to a great extent; a heavy carriage going down George-street, we know, shakes the whole place, and you would find the subway shake.

4219. Do you think, as regards the subway which is now laid in Southwark-street, that if traffic went over it, such as you have described, heavy railway vans with four horses, carrying six tons, at six miles an hour, the pipes laid in that subway would vibrate?—I have no doubt they would.

4220. *Chairman.*] But sufficient to break the pipe?—I do not know that it would be sufficient to break the pipe; but if the pipe were so placed, as it might be, that one portion rested on a hard place, and not the other, it might break.

4221. Mr. *Jackson.*] The pipes are to be laid, you know, upon chairs in the subways?—You, as a practical man, know what that would be; there is a great deal of happy-go-lucky in that kind of work.

4222. Viscount *Galway.*] You, yourself, have made a great many improvements in laying pipes in your experience?—I have; I believe the greatest improvement I ever made was inducing the founders to cast them vertically.

4223. Mr. *Jackson.*] The pipes are cast vertically?—Yes; at Staveley and several other iron foundries.

4224. They are tested there, but they are not tested after they arrive in London?—Not always.

4225. *Chairman.*] Do you know how that is as to gas mains?—I do not.

4226. Mr. *Jackson.*] Have not the gas companies lately taken the side streets to lay down their great trunk mains, instead of going through the great main thoroughfares; for instance, in a street across Portland-place, have they not lately put 36-inch mains where there is little traffic?—I do not know.

4227. Mr. *Bagwell.*] Are you acquainted with Mr. Bramwell?—Yes.

4228. Mr. Bramwell told us that "assuming an escape to take place, and there

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there were ventilators provided at every 100 feet, the gas, as it escapes, naturally rises from its being so much lighter than the air; I believe that as soon as it has reached one of those openings, which are at intervals of 100 feet apart, it would make its escape upwards into the road in the same way as water would make its escape downwards into the sewer"?—I think Mr. Bramwell is mistaken, because he assumes a state of things that will not always take place; we all know that gases and atmospheric air, consisting of a series of globules taken at the same temperature, and you cannot push those globules on one side.

4229. As a matter of fact, if there was water in the middle of the floor, it would flow down?—That is certainly correct as regards water, but not as regards gas.

4230. If that is so, the gas would flow upwards?—It would, provided the atmosphere was in a state which permitted it to do so; with a very sluggish state of the atmosphere, it would puzzle you to ventilate this room, you may get it in, but you cannot get it out; it is the most difficult thing in the world.

4231. Mr. *Duff.*] Is the atmosphere ever in such a state that a balloon cannot get up?—No.

4232. How does it get up?—From the difference between the weight of the gas and the weight of the atmospheric air.

4233. *Chairman.*] You said that most of the jobs you had to do you managed to get through in 12 hours; did you happen to see the works in Southwark-street; did you go there while they were going on?—I was there several times.

4234. How long do you think they took?—I am sure I cannot tell you.

4235. Do you think they took a fortnight?—I do not know, I am sure.

4236. Much more than a day, at all events?—Yes.

4237. With reference to night work, how do you manage with the workmen, do they object to it?—No.

4238. They do not?—No.

4239. Except the additional wages, have you any difficulty in dealing with the workmen?—No.

4240. They do not object to continue beyond a certain time, when they would usually knock off?—No; but I may say that I am very liberal with the men; I expect them to obey me, and they do not remonstrate in any way whatever. During 40 years I have never had a strike against me; I can command my men; they do anything I wish; they are like soldiers. I always tell them, "Do your duty first, and then you may remonstrate afterwards, and I will listen to you." There are no men so well aware of the injustice of anything done to them as working men, and they never forget it.

4241. But however, practically, you do not find any difficulty in night work?—I never found it; on the contrary, I believe if they knew that I was going to a job myself at night, they would go in preference; but I am generally very liberal to them; it does not do with working men, if they exert themselves, not to reward them.

4242. You never met with this case, that you offered double wages for the men to stay on Saturday afternoon, simply to get out of the way a large scaffolding, and that they refused, notwithstanding all the offers of the foremen to ask them to be good enough to get rid of that scaffold so as to be clear on Monday morning?—I never met with anything of the kind.

4243. Mr. *Jackson.*] You think a good master makes a good man?—Yes.

4244. *Chairman.*] You have never felt the effect of the union?—No; I never employ a union man, at the same time when he comes to us we never ask the question; if he is a good man I should take him on, and I take very good care that the inspectors, or the foremen, do not tyrannise over the men. If I am on the works at any time and a man comes to me to make his complaint, I take care to hear him.

4245. But, as regards the present Bill, as we understand your company are really not interfered with, except it may be accidentally by something at Northumberland House?—I say, with regard to the present Bill, I know that my company feel that it may be extended to them very injuriously. When a measure is about to be introduced which exceeds the value of all the pipes together, it is very doubtful whether they would meet it in any way.

4246. Then they quarrel with the principle, without any practical knowledge upon the subject?—That is one of the reasons they do not like moving into subways at all, irrespective of the expense; we know the evils of what we now endure, but we do not know what this may bring forth.

4247. What are the public in this case?—I do not know.

4248. Do you think that the public do not endure some evils in the shutting up and blocking of the streets?—No doubt they do; but whether that will ever become inseparable from a large community I do not know; my own opinion is that it will not.

4249. Viscount *Galway*.] You stated, as regards the openings in the streets, that that related merely to the water plugs?—Yes, and cocks.

4250. That does make a very large opening?—No; but in case we want to lay another pipe, then we may want to have another subway.

4251. Do the water plugs very frequently get out of order?—Yes; in macadamised streets especially.

4252. Not so much in the paved streets?—No.

4253. *Chairman*.] Did you see the hydrant or water plugs in Garrick-street? Yes.

4254. How long has that been done?—I do not know.

4255. But you have not heard of its being taken up?—No; but I believe the company have got a larger one, a much more expensive thing, termed the Hambro' hydrant, a very expensive thing indeed.

4256. Do not you know that the Committee to which that has been referred has objected to the use of it on account of the expense, and reported in their statement that they do not see any necessity for that expensive arrangement; do you know that?—I only know it from report.

4257. Mr. *Richards* (through the *Committee*).] Is not Southwark-street within the Parliamentary limits of the Lambeth Waterworks Company?—Yes.

4258. Therefore, under the Waterworks Clauses Act they might be called upon to supply water?—

4258* *Chairman*.] Why do not you do it?—We do one end of it, the Blackfriars end of it.

4259. Are there any of your pipes in the subway there?—No.

4260. To what extent do you go down Southwark-street?—I do not think more than 100 yards.

4261. Mr. *Richards*.] But the whole street is within the Parliamentary limits of your company?—I believe it is.

[The Witness withdrew.

Mr. *William Innes*, called; Examined by Mr. *Richards*.

Mr. *W. Innes*.

4262. You are a Civil Engineer, I believe?—I am.

4263. And have been engineer to the Phœnix Gas Company for upwards of 20 years?—Yes.

4264. Is Southwark-street within the district of the Phœnix Gas Company?—It is.

4265. You have two large mains in that street; one on each side of the street?—We have.

4266. What is the diameter of those mains?—Twelve inches.

4267. At the time that the Metropolitan Board of Works were making that street, and before it was paved, did your company give notice to the Board that they should have to lay two mains in that street for the purpose of supplying gas?—They did.

4268. Did they ask permission of the Metropolitan Board to lay those mains?—They did.

4269. Was that before the street was dedicated to the public use?—Yes; before it was paved, or dedicated to the public use, while it was the property of the Metropolitan Board.

4270. Before, therefore you were liable to be called upon to supply gas?—Yes.

4271. Did the Board give you the permission that you asked, or, did they refuse?—They refused it.

4272. *Chairman*.] Have you the correspondence?—We have.

4273. Mr. *Richards*.] Have you got it with you?—No; I have not it with me.

4274. Mr.

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4274. Mr. *Cripps.*] If it is in writing, let us have it at the next meeting?—You shall have it at the next meeting of the Committee.

4275. Mr. *Richards.*] At that time the street, you say, had not been made public?—It was not paved, nor fit for transit in any form whatever; it was in course of construction; the subway itself was not arched over.

4276. Had you laid down your pipes before the paving was finished, I suppose you would have laid them down at a considerably less cost than afterwards?—We should have saved all the cost of paving, as well as the cost of the disturbance of the street.

4277. Then, you had to take up the street, and lay down the pipes, and afterwards to re-pave the street?—Yes; since being here before, when the subways were objected to for the use of gas, we have taken up the paving and laid our pipes, since 1864.

4278. Since 1864, the street having become public, you were compellable by Act of Parliament to lay down gas pipes?—We were.

4279. The Committee of 1864 having refused to put gas pipes into subways, you were, of course, obliged to take up the street?—We have done so.

4280. You did so, and you have laid down your pipes, and re-paved the street?—Yes.

4280*. Mr. *Jackson.*] Did the Board of Works refuse to let your company put the pipes in the subways?—

> Mr. *Cripps.*] I ought to object to that, because, inasmuch as it is in writing; when it is produced, we shall see what the Board of Works said.

4281. Mr. *Richards.*] I will not go into the question of additional cost that was imposed upon you in consequence of that, I will go into the question of the subway itself; are you acquainted with the subway in Southwark-street?—I am.

4282. And have been in there frequently, I suppose?—Very frequently.

4283. As a gas engineer, looking at the possible and probable requirements of that neighbourhood, do you consider that subway adequate for the purpose for which it professes to be intended?—If limited to Southwark-street alone, the capacity of the area would be sufficient for the purpose required in Southwark-street, but if it is to be the conduit to other streets, it would fail to be so.

4284. In what way would it fail?—Because it is not of sufficient capacity to contain the pipes that are now crossing it, belonging to the Phœnix Gas Company.

4285. What do you mean by "crossing it?"—At right angles; in the sketch there the upper one of the three, are shown the pipes that are crossing it at right angles; that triple line, and that of itself would occupy the subway.

4286. Those are crossing at right angles?—The upper series are.

4287. You of course were familiar with the subway when it was originally constructed; the question was before Parliament in 1864?—I was familiar with it from its starting.

4288. With reference to the kind of services at present; I believe you have gas pipes on each side of Southwark-street?—We have pipes put on each side within about 3 ft. of the kerb of the foot pavement.

4289. Therefore your service pipes only go from the pipe which lies at the side of the road to the house on the same side?—To the cellars adjoining or immediately under the footway.

4290. *Chairman.*] Is that those green dots which are right and left; which are the gas?—The blue point there is the gas pipe, and the green is the water pipe; one is our large constant pressure main, and the other is the service pipe going along the street; the blue next the footway is a 12-inch gas main, and the green one, the 10-inch, is the fire main of the water company, the constant supply main; and the 5-inch green main is the service of the water company.

4291. Lying intermediately between the gas and the water?—Yes.

4292. Were those all put in at once?—Yes; at one time.

4293. When the trench was cut?—Yes; when the trench was cut sufficiently wide, 18 inches beyond the pipe on each side, and the whole hole was taken out the entire depth of the concrete you see there, and entirely new concrete substituted to the ground.

4294. That is where it was reinstated?—That it where it was reinstated, so that the trench was open the whole width.

4295. How wide was the whole opening?—About 11 feet wide.

4296. On both sides?—Yes; on both sides of the street.

4297. Mr. *Richards.*] Your services, you tell us, are at present carried from the main at the side of the street to the houses on that side of the street?—Yes.

4298. If they were put into the subway, would not the services be very considerably increased in length?—The position represented by the pipe here is this; here would be the gas and water pipes in this case, and the service pipe would have to be extended along the chamber which you see here, and be returned up inside the coal cellar of the house, taking the service pipe from the position in which the main is proposed to be placed to the area, in the one case; it would make 8 feet in length of service pipe, and in the other case, 38 feet.

4299. Am I not right in saying that every additional charge thrown upon the gas company of that sort, or indeed of all other sorts, practically falls upon the consumer?—It must be so; it is an incident in the cost of the supply.

4300. Falling upon the consumer, and preventing the reduction of the price of gas which the consumer is entitled to under the Gas Clauses Act?—Yes.

4301. Viscount *Galway.*] What are you allowed to charge for gas?—Our charge at present is 4 *s.*, our limit is 4 *s.* 6 *d.*

4302. Mr. *Bagwell.*] What is your dividend?—We have varied dividends; we have three capitals; we have a 10 per cent. capital, and a 7½ per cent capital, and a 5 per cent. capital; the average is about 8½ per cent. on our capital.

4303. Mr. *Duff.*] Is that limited by Act of Parliament?—It was limited in 1860.

4304. *Chairman.*] To 10 per cent.?—To 10 per cent. upon the old capital; to 7½ per cent. for the new capital, and 5 per cent. for the consolidated capital.

4305. Mr. *Richards.*] Of course, when you reach a certain point, and when you have made a certain reserve fund, you are to reduce the price of gas?—We have done so.

4306. And every increased charge you get tends to postpone the reduction in price?—It has that immediate effect.

4307. That of course would apply to any rent, or any charge of any sort that you had to pay for the use of the subways?—It would equally so.

4308. With regard to the construction of the subways; in the Southwark-street subway there are openings, we understand, for the admission of the workmen and materials into the subway?—There are, on each side of the street.

4309. Are they, in your judgment, sufficient to admit gas pipes of the ordinary length or diameter, say a 24-inch pipe, or a 36-inch pipe?—They would not admit of a 24-inch pipe at all; they might admit the smaller pipes in shorter lengths.

4310. I ask you, as a practical man, whether you have seen the reflected light they speak about?—Yes.

4311. In your judgment, could the operations be carried on in the subway which is there by means of that reflected light?—Not by the workmen; the reflection would be very beneficial for the inspection of the subway, but not to carry on practical operations.

4312. You say that you have seen the subways frequently; have you ever seen them flooded?—I have seen water in the bottom.

4313. Where did that water come from?—From the sewers.

4314. Flooding from the sewers?—Yes; rising up from the sewers. Speaking of inspection, my inspectors go there every week in the year; every Monday morning, as regularly as possible, to examine the state of the meter index, so that we have a correct registration of the state of the subway for each week in the year.

4315. *Chairman.*] Are any of your pipes in that subway now?—The pipes are not the property of the Phœnix Gas Company, they are the property of the Local Board, transferred by the Metropolitan Board to them; they are mere service pipes, for the supply of gas to the street lamps.

4316. Mr. *Richards.*] What is the diameter of them?—Two inches.

4317. Those are laid the whole length of the subway, are they not?—Yes, all the length, from Guildford-street on one point, down to the Borough on the other.

4318. Mr. *Jackson.*] The supply of gas is determined by your own meter? —

—The companies supply by meter, and the Local Board pay for the gas we supply by meter.

4319. Is the meter under your charge or theirs?—It is under our charge, with the right of entrance at all reasonable times.

4320. Mr. *Richards.*] In short it is treated as their own private property?—Yes.

4321. Mr. *Jackson.*] Under the control of the Phœnix Company as regards quantity?—Yes; we have to provide our inspectors occasionally with boots to wade through.

4322. Mr. *Richards.*] To wade through the slush in the subway?—Yes.

4323. It was not in that state the other day, I hope, when you were there?—No, it was not.

4324. When the Metropolitan Board of Works laid their pipes that now lie in the subway, were they laid by candle or artificial light?—They had a great number of candles burning, as well as a few oil lamps; they had a great many candles burning to see to carry on their works.

4325. Young Mr. Jones said, in answer to question 1818, that mains laid in the open ground would not be sound 48 hours after they were laid; with your experience as a gas engineer what do you say to that?—We have had pipes that have been down for 40 years and they are perfectly sound now.

4326. Do you agree with what has been stated by Mr. Simpson, that with all the care that can possibly be taken, a certain amount of leakage will exist at the joints of the gas pipes?—In some positions leakage will exist where pipes are liable to damage either by vibration or the subsidence of the ground, or by unequal temperature; but in a general way, in the streets of Southwark, as well as in the surrounding district, there it is a clean equable gravelly soil, and the pipes are not very liable to break or to much damage.

4327. Supposing the gas pipes are to be laid in the subways in the manner proposed, do you believe that you would be able, practically and absolutely, to prevent leakage from the joints, to some extent?—We think not.

4328. I need hardly ask you, in the event of leakages occurring, what is your opinion as to the probability of those accidents being attended with much greater loss and injury than they would be when occurring in the open street?—All operations are to be performed with artificial light, and, consequently, if an escape of gas spreads itself over the whole area of the arch, an explosion would immediately be the result.

4329. In the case of a subway occupied to a slight extent, as the Southwark-street subway is at present, do you think that the pipes might easily be laid, and in all probability accidents might not occur, occupied as it now is by two or three pipes?—Very great caution is at present exercised in the use of the gas that is in that subway; every week before our inspectors go down, they open the trap door to ascertain whether there is any indication of an escape of gas, before they go down with a light to examine the meter.

4330. Supposing all the services connected with the different houses to be in existence, and fresh pipes to be introduced, do you as a practical man, think that those fresh pipes could be introduced without very great risk of injuring the services connected with the existing pipes?—If anything in the shape of such a proposal were to be made it would be madness; just take Southwark-street, there are 140 houses on each side of it.

4331. *Chairman.*] Or will be I suppose?—It is provided for 140 houses, by the vaults and arches, in addition to which there are 64 lamps and 16 at the end, making altogether 80 lamps, and if those had to be provided with service pipes from the main, and if it be proposed that the gas and water companies should occupy that subway with their mains, it would be impracticable to put down a large pipe there, until the smaller ones are taken away; there is not sufficient space to give what would be a reasonbaly increased capacity of pipe.

4332. Mr. *Richards.*] What I want to know is, supposing the various services necessary for the supply of the houses in Southwark-street to be connected with the houses from the pipes now existing, what, in your judgment, would be the difficulty of introducing a fresh pipe into the subway; do you think it would be much increased or not?—It would be very much increased.

4333. Suppose 140 houses had their necessary services on both sides, would it be practically impossible to introduce fresh pipes into Southwark subway?—You have not asked that question with regard to Southwark-street subway.

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4334. Are there any pipes in the Southwark-street subway?—There are six in a short portion of it, near Gravel-lane; two 18-inch, two 9-inch, and two 6-inch.

4335. I presume they are put in experimentally as it were?—They are not used for gas, but merely put in to show how they would lie.

4336. Would it be possible, as the pipes lie there at present, if it were required to introduce another pipe?—It would depend upon the size.

4337. Would it be possible to introduce an 18-inch pipe?—No; not another 18-inch pipe, but it might be possible to introduce two 6-inch pipes or two 8-inch pipes.

4338. Supposing the service pipes which would be necessary to connect these pipes, if they were really in use, with the houses, were laid down, would it then be possible to introduce an additional pipe, or would those service pipes interfere with that?—The service pipes would very much interfere with any additional pipes being put into the subway if it were merely a single pipe; but if a double pipe and the services were going at right angles to each other, of course there would not be the same difficulties to contend with.

4339. Viscount *Galway.*] You do not like to have a pipe at right angles?—All service pipes are at right angles.

4340. Then is there no objection to service pipes being at right angles?—From the mode in which service pipes are attached to the main pipe, it is almost necessary that they should be at right angles. The majority of them are screwed into the cast iron metal, and, therefore, in order to make the joints secure, you have to do it at right angles.

4341. Mr. *Richards.*] Now with regard to the work done in subways, with an artificial light, in a confined space, in your opinion, would that be better or more fitly done than it is now done in the open street?—It would not be done so expeditiously.

4342. I presume that if there was an escape of gas and explosive mixture into the air, you agree with what the other witnesses have already said with reference to the great danger arising from an explosion?—Yes; there would be an immediate danger arising from an explosion in so confined a space.

4343. Some question has been asked as to the way in which gas rises in atmospheric air; of course gas being lighter than air it does rise?—It does rise, but it diffuses itself in its ascent; it does not rise in a column.

4344. It does not rise as air rises in water?—No; it diffuses itself through the area of the chamber, or whatever it is that it is in, until it gets to the top.

4345. And the explosive mixture that is forced up is not much lighter than atmospheric air?—It is almost as light as atmospheric air.

4346. When the question was asked whether a balloon will or will not rise, the answer referred to a balloon not filled with an explosive mixture, but with gas?—They sometimes endeavour to get very light gas indeed for balloon purposes.

4347. Is it not the fact that cannel coal gas will not serve for balloon purposes?—It will not lift a balloon with the car attached. If 27-candle gas were put into a balloon it would have no buoyancy. It is almost of the specific gravity of the air surrounding it.

4348. *Chairman.*] The carbon makes it heavy?—Yes.

4349. Mr. *Richards.*] It was stated by Mr. Carpmael, that an easy mode of detecting when gas escaped would be to coat the pipe with white lead, and when there was any escape the lead would turn blue, and so the escape would be detected; what is your opinion with reference to that?—That is not so, with the supply of gas in London. You cannot detect an escape of the sulphuretted hydrogen by the common acetate of lead. What Mr. Carpmael states can scarcely be so, when we are under a restriction not to supply gas with 12 grains of sulphur.

4350. In the case of gas escaping, does your experience tell you that it frequently travels a long distance from the actual point of escape?—It depends very considerably on the current which is in the chamber at the time. If there is a considerable draught running along, it will carry the gas with it for a considerable distance, and the smell would be detected from a point away from the escape itself.

4351. Have

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4351. Have you had any practical experience with reference to the explosion of gas in cellars?—Yes; very considerable.

4352. In your own district?—And in my own personal district, as well.

4353. What is that experience?—I have had to pay compensation in the cases of as many as 10 separate explosions.

4354. Were they explosions resulting from carelessness on the part of your own workmen, or from the collection of gas arising from leakage?—Chiefly from the collection of gas arising from leakage.

4355. Gas escaping into private houses?—Some of them into the subway chamber, and some of them into cellars, and some of them into the drains under the houses, and others of them from an escape on the surface.

4356. All being escapes which might take place in a subway?—Decidedly. The conditions are similar to what would be the conditions of an escape in a subway.

4357. I believe there has been recently a very bad escape, has there not, at Nexborough?—Yes; on the 29th of June. I have an account in a Yorkshire newspaper of an explosion in a house at Nexborough.

Mr. *Cripps.*] We cannot have that.

4358. *Chairman.*] Do you know anything about that case yourself?—No; I do not; I only know it from a newspaper paragraph.

Chairman.] Then we cannot go into that.

4359. Mr. *Richards.*] You have given us a diagram of the pipes and mains at Vauxhall Cross; what are the main lines at Vauxhall Cross?—There are 14 large mains in that street.

4360. Including a 36-inch main, a 30-inch main, and a 27-inch main?—Yes; and lying precisely in the position indicated upon that section.

4361. *Chairman.*] Where is Vauxhall Cross?—Just at the foot of Vauxhall Bridge, leading to Nine Elms, precisely opposite to Price's Candle Factory.

4362. Mr. *Richards.*] That is in your district?—It is.

4363. Is that a fair sample of the number of mains now lying in a leading thoroughfare of your district?—No; that is an excessive sample.

4364. They would not generally be so numerous as that?—Not so numerous.

4365. Which are the the gas mains, and which are the water mains (*pointing to the section*)?—The blue are the gas, and the green are the water.

4366. Mr. *Jackson.*] Then from that portion of the metropolis your mains diverge?—Our large manufacturing works are there.

4367. *Chairman.*] Your head quarters are at the foot of the bridge?—Yes. Two of the larger pipes are used for the conveyance of the gas from the gasholders, and are in use daily.

4368. Is that where the explosion occurred?—Yes; but it was not in connection with our works, the explosion was in connection with the London Gas Company's Works.

4369. Mr. *Richards.*] Will the Southwark-street subway accommodate the large number of pipes that are in existence at Vauxhall Cross?—No; it will require two subways to do that.

4370. Is your knowledge of London sufficient to enable you to say that there are in many parts of London a very large number of pipes, if not quite the same number as at Vauxhall Cross?—I know many places in London where there are 22 pipes in the street.

4371. Are those places leading thoroughfares?—Yes; such as Charing Cross, Whitehall, Regent Circus, and so on.

4372. Thoroughfares where, if anywhere, the inconvenience of opening the streets is the greatest?—Yes.

4373. Where in a subway it would be of most advantage, as far as preventing the breaking open of the streets?—Yes; the importance of the locality is much greater.

4374. Now with reference to breaking up and opening the streets, of which we have heard so much; when your gas mains are once laid down, does it often happen that they are taken up again and interfered with?—Very seldom indeed; they are seldom disturbed.

4375. I will ask your opinion, as a gas engineer of great experience, whether you

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you approve of the scheme which is suggested with reference to these subways?—I do not.

4376. They have gone to a certain extent; do you think it desirable that they should go any further?—I think it is a great failure.

4377. Mr. *Bagwell.*] Will you tell us why you consider they are a great failure?—From the thorough want of security for gas-pipe purposes.

4378. As shown how?—The use of that subway applied for water, gas, telegraph, and such purposes, would introduce a considerable number of working people into them.

4379. I am not asking you with reference to what may happen, I want to know upon what actual experience you have founded your opinion, not what might take place, but what has taken place; you say it is a failure, therefore I want to know why you say it is a failure?—I thought I was proceeding to state why it would be a failure.

4380. No; you say it is a failure?—Will you take it then that it will be a failure; my reason for saying so is that in all situations similar to the subways in which pipes for gas have been introduced, that we have been exposed to considerable damages arising from the escape of gas in them. In the subway under the dock at Greenwich, in the subway under the Ship Hotel at Greenwich, in the subway under our own works at Bankside, and in the covered way behind the works at Wellington-street, we have been exposed in each of those cases to an escape of gas from the contraction of the metal drawing the lead joints of the pipes, and so causing an explosion.

4381. *Chairman.*] Has there been any accident?—Yes.

4382. Where?—There was a very serious accident at our works at Bankside. It exploded the engine-house altogether, and damaged the Phœnix Company's works there. There was also an explosion in the subway under the Ship Hotel at Greenwich, and we had to make compensation, and I think it cost us nearly 500 *l.*

4383. What sort of a subway is that under the Ship?—An archway precisely similar to the subway in Southwark-street.

4384. Mr. *Duff.*] What are the dimensions?—Eight feet by seven feet.

4385. What was the cause of the accident?—A workman disturbed the service pipe leading to a meter, and it got broken in some way, and when they went down afterwards with a light to perform some operation there, the gas exploded. One man was killed on the spot, another man was very much injured, and a third, the managing man, was burnt all round the shoulder and arms.

4386. *Chairman.*] Was there any ventilation there at all?—Yes.

4387. What sort?—Through gratings coming into the passage.

4388. The passage of the house?—It is a covered passage between two houses. It was an old communication into the street, and that was retained by the authorities of Greenwith Hospital as a communication between the one street and the other. The Governor of Greenwich Hospital gave the hotel people permission to use the old covered way or passage as a way for the household, if they would construct on each side of it a building. That they have done, so that it now is a kind of subway.

4389. Mr. *Bagwell.*] What was the ventilation?—Through openings or gratings, such as there are in subways.

4390. Mr. *Jackson.*] Was there a thorough ventilation at each end?—No; I think not.

4391. Then it was a kind of closed box?—It was, practically, a closed box.

4392. From which the gas could not escape?—It had no elasticity to escape in it.

4393. Mr. *Paull.*] There is a subway under the passage between the two houses?—There is a subway under the passage between the two houses.

4394. Having gratings in the subway opening up into the passage?—Yes.

4395. Are the ends of the passage closed?—The ends of the subway are closed.

4396. But not the ends of the passage?—It is a common communication for the people to work through.

4397. Therefore

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4397. Therefore the gratings open up in the same way as they do in the street?—Precisely.

4398. Except that there is a kind of covering?—Yes.

4399. The ends of the passage are open?—Yes.

4400. Mr. *Jackson.*] But not the ends of the subway?—No.

4401. Whatever happens, the air could not get out unless there was something to force it forward?—The ventilation is the common ventilation passing under the vault of the premises; the only movement of the air is such as is created in a retort house 200 feet long.

4402. Mr. *Floyer.*] What is the length of that subway?—About 45 or 50 feet.

4403. Mr. *Richards.*] The passage was closed in the same way as the subways are now?—Precisely; that is built in brickwork.

4404. *Chairman.*] Is it still used?—Yes.

4405. Mr. *Bagwell.*] What other accidents have you any knowledge of?—One occurred at Greenwich by a contractor, making a sewer, breaking some pipe, which we were not aware of, that communicated with the gallery that went under the house. We were not aware that there had been an old conduit. When the pipe was broken, the gas came through the back gratings of that house and exploded, and the damage cost us nearly 2,600 *l.*

4406. How do you lay the blame of that to the gallery?—The gas accumulated in the gallery.

4407. It was a gallery that you did not know of?—We did not know of it for gas purposes. It was only after opening the ground that we discovered that the contractor for the sewer had covered it over, and then we found that there was a covered way underneath the house.

4408. That might have taken place if you had been laying gas pipes in the ordinary way?—That is an escape in a covered way.

4409. Viscount *Galway.*] What have you done in consequence of that accident at Greenwich?—We took the gas pipes entirely away. We stopped the supply of gas entirely through that pipe.

4410. Mr. *Duff.*] But you continued to use the subway, did you not?—We took the pipe away from it.

4411. Then you do not use it now?—There is no supply of gas going through that covered way.

4412. Mr. *Jackson.*] You supply the hotel from another source?—We diverted the supply pipe so that it should not go into such a dangerous place.

4413. *Chairman.*] I suppose in that case you were not to blame?—We tried to evade the consequences, but the jury gave a verdict against us.

4414. Mr. *Bagwell.*] Have you any other case that you can mention?—I have mentioned the accident that took place at our works; the retorts are on one side of the building, and the explosion took place at the other.

4415. *Chairman.*] Were there any openings?—There were side openings.

4416. But none in the roof?—It did not reach the roof, it is only about 9 feet high; the opening came up from the retorts.

4417. That was part of your works?—Yes.

4418. You often have explosions there, do you not?—Not very often.

Cross-examined by Mr. *Cripps.*

4419. First of all, with reference to the accident that occurred at Greenwich; was that a place open to the workmen to inspect?—It was then open to the workmen.

4420. How do you mean then open to the workmen?—Because they were constructing a building at the side of it; the managing man had a communication through this subway.

4421. But I suppose it is a place which workmen do not go along in the ordinary way?—It has been used as a wine cellar since.

4422. Do you know the large cellar of the London Docks?—Yes.

4423. Do you light that?—No; we do not.

4424. I mean the large five acres-vault?—We do not light that.

4425. Which company does?—I think it is lit by candles; there is no gas there, I think.

4426. Now, one word about those diagrams of the pipes at Vauxhall Cross; I see you have put the pipes there for the information of the Committee; I suppose the pipes which are represented there are the pipes lying between the gasometer where your gas is stored, and your works?—Two of them are there.

4427. Do you mean to say that that is any illustration whatever of the pipes which are in the London streets?—Two of them are there.

4428. Are those pipes that are represented there pipes belonging to the works between where your gas is manufactured, and where the gas is stored?

Chairman.] I think you need not press this, because the witness has answered as fairly and as candidly as possible, that that is an explanation of the pipes close to their own works, but that he can point out crowded thoroughfares in other parts of London, where there are a good many pipes laid.

4429. Mr. *Cripps.*] I object to a diagram being produced which would mislead the Committee. (To the *Witness.*) Let us take the diagram above that one of the part of the subway at Gravel-lane within 30 feet of Southwark-street; what pipes are those?—The blue pipes are the property of the Phœnix Gas Company, and the green pipes are the property of the Water Company.

4430. Are those three sets of pipes 18 inches, 18 inches, and 18 inches?—Yes.

4431. How came they to be there?—For the purpose of conveying gas.

4432. Do you mean that if you had now to supply that street, or put a main down there, that you would think it necessary to put down those three sets of pipes?—We have them there.

4433. They may have been there, and you may not have taken them up; you propose to put others down; if you were now going to lay down pipes along that street, would it be necessary to put those three mains there?—For what purpose?

4434. For the ordinary purpose of supplying customers?—The pipes are there for the conveyance of gas between the works and the gasholders.

4435. Your answer about the lower diagram applies to the upper diagram?—To the extent of two of the pipes.

4436. *Chairman.*] The Honourable Member on my right, who is practically acquainted with this subject, suggests that those two ought to be struck out?—Will you permit me to make an observation; it is rather important that I should show that those two pipes were there, because we use them for the purpose of conveying the whole of the gas manufactured in our manufacturing station, and any diversion therefore, as the Honourable Member quite knows, would create an obstruction in the flow of the gas, and which would be a serious objection, as they are used for the conveyance of very large quantities of gas.

4437. Mr. *Jackson.*] You are supposing a subway having the same number of pipes put into it that there are at Vauxhall Cross, but the Committee are dealing with the subway in a very different part of the metropolis altogether. Those two large mains, which supply the gas from your works, would never come into any of those subways; is that not so?—We were required to put them in.

4438. All those mains?—Yes.

4439. Do you mean that you were required to put them into the subway in Southwark-street?—Yes; we were positively required to put them in.

4440. *Chairman.*] You mean that you were required to put the 2-inch mains in?—No; those large mains.

4441. Mr. *Jackson.*] Those four mains?—Yes.

4442. For what purpose?—That is a question I cannot answer.

4443. *Chairman.*] Who ordered it to be done?—The engineer of the Metropolitan Board of Works.

4444. Mr. *Jackson.*] Do you mean that he required that you should put those four large mains in the subway in Southwark-street?—Yes.

Mr. *Jackson.*] It is quite clear there must be some misapprehension about this.

Mr. *Richards.*] No, sir, I do not think there is.

4445. Mr. *Cripps.*] Have you got the requisition in writing?—I believe I have a requisition from him that all the pipes crossing the subway should descend into the subway.

4446. Do you mean that Mr. Bazalgette, knowing that those three or four pipes were there, required you to put them in the subway in Southwark-street?—He not only knew it, but he provided me with an iron plate to put underneath them to secure them in the subway.

4447. Do they go down the street at all, or across it?—They go across the street at right angles.

4448. Is what you show on that diagram within 30 feet of Southwark-street?—Yes.

4449. All those?—They are there now.

4450. They are there for the purpose you spoke of, namely, of communicating between different parts of your manufactory?—Two of them.

4451. How would you lay those in a street. You have crossed over other pipes which are coming down the street. Would they cross other pipes at right angles in the street?—If we had that to do now, they would.

4452. Assuming there are no subways at all, would you do so?—Yes; they would have to cross at right angles.

4453. Then, in the case of any repair to the pipes underneath, you would have to disturb the upper one?—Yes.

4454. Assuming there is no subway?—That is what we have to do daily.

4455. Now, you have pointed out another matter with regard to the sub ways; the service pipe is rather longer than it would be if the pipe was on each side?—That is so.

4456. Does the service pipe from the main in the subway serve two houses?—It is intended to serve two houses.

4457. At present you have service pipes laid down to each house from the main?—We have to each pair of houses.

4458. I am not speaking of the subway?—The common supply is to each pair of houses where it has been supplied; provision was made that the service pipes for water and gas should go to each pair of houses, and we have carried that plan out.

4459. Do you mean with reference to subways?—With reference to the supply of gas to the houses in a street.

4460. I am not speaking now of a subway?—No; I perfectly understand you.

4461. I am taking the ordinary supply to houses in a street; is there not a service pipe to each house?—One service pipe from the main divided into two, forming a double leg, one to each house.

4462. How far does the one pipe come?—About six feet.

4463. Then it diverges into two?—Yes.

4464. You have spoken of these other subways; you have always had free access allowed to you to this subway in Southwark-street, have you not?—Always.

4465. I believe you gave evidence against the Bill in 1864?—I did.

4466. From that time you have had every opportunity, have you not, of seeing that subway whenever you pleased?—Yes, at all times; I have a key in my possession, and I can go down at any time.

4467. Without any restriction?—Without any restriction whatever.

4468. You could go down, and nobody know that you were going down?—No.

4469. You had every opportunity of going down whenever you liked to go?—Yes.

4470. Viscount *Galway.*] Did you take a safety lamp with you?—A common enclosed lamp; one of the ordinary bulls-eye lamps.

4471. Mr. *Cripps.*] This is a matter which has happened since you have gone down there?—Yes.

4472. You say you have seen water at the bottom?—Yes, I have.

4473. What amount of water have you seen?—I have seen as much as 12 inches of water.

4474. That was on some particular occasion?—I have seen it three or four times, on rather particular occasions.

4475. *Chairman.*] Where?—At Guildford-street; it went along the whole course of the subway.

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4476. Mr. *Cripps.*] I am speaking of the Southwark-street subway?—Yes.

4477. Can you give me the date of any particular occasion when that water was there when you saw it for any length of time?—One of the great floods I saw was some time about the latter end of October 1865; it was during a very severe thunder storm, when an immense quantity of water came and surcharged the underground sewer altogether, and flowed up through the trap opening into the sewer itself.

4478. That was in October 1865?—Yes.

4479. How long did that water remain there?—About three days. I was informed by Mr. Grant, and also by the local surveyor, that there was an obstruction through an accident which had taken place.

4480. Mr. *Jackson.*] You do not know where the obstruction took place?—Under the Obelisk at High-street, Borough, where they had been making a diversion from one sewer to the other, and they had left a mass of materials there, not foreseeing a storm was coming.

4481. Years might roll over before another accident like that occurred?—Yes.

4482. Mr. *Cripps.*] You have frequently had to deal with accidents through explosions, have you not?—I have.

4483. You find that unavoidable under the present system, do you not?—I do.

4484. Leakage will go on?—Very extensively.

4485. And it is not easily detected until it has gone to some extent?—Not with large mains.

4486. I dare say you confirm what has been said by the other witness, that gas finds its way a considerable distance from where the leakage takes place?—Yes.

4487. That is a matter which you are constantly being made liable for at the present time?—Yes.

4488. I believe the Phœnix Company particularly have had many accidents from explosions?—They have had some.

4489. That has been a serious item to you?—Yes.

4490. Then the probability is, that if you serve houses under the present system, that will continue?—It is an incident of our expenses.

4491. It is one which you calculate upon for the future if the present system remains just as you have done for the past?—Yes.

4492. Can you give me the specific gravity of cannel gas as against common gas?—What sort of cannel gas do you mean; do you mean the ordinary gas supplied, such as the Chartered Company supply from house to house.

4493. They mix it with some other gas, do they not?—No; that gas is very pure. The specific gravity of that gas would be about 7·78.

4494. That would be a small matter?—It is just the weight of common air.

4495. What is the specific weight of gas as regards common air?—The gas that is generally supplied in London would be 4·50.

4496. Do you know the quality of the gas they supply in Manchester and Liverpool?—They do not supply the same gas there.

Re-examined by Mr. *Richards.*

4497. You have been asked, with regard to this Vauxhall Cross, whether there is any subway proposed there, and you truly say there is not by this Bill?—At present there is not.

4498. This Bill affects any subway to be constructed under the authority of "any Act passed in the present Session of Parliament, authorising the construction by the Metropolitan Board of Works of any subway under any new street, thoroughfare, roadway, or place to be made, formed, embanked, or improved by such Board"?—That is so.

4499. Therefore the provisions of this Act may extend to that?—Yes.

4500. You have been asked a great deal about the damages which you have had to pay in consequence of explosions taking place under the present system; do you believe that the risk of damage will be materially reduced, if at all, by the

pipes

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pipes being laid in subways?—I think not; but on the contrary, that the risk will be rather increased.

Examined by the *Committee.*

4501. Mr. *Duff.*] Do you insure against accident?—No; we do not.

4502. Then you do not know whether the insurance companies make any difference with reference to gas pipes being laid in subways?—I do not know that they would; we have never asked them the question; we keep an insurance fund, therefore we do not require to insure in the offices.

4503. *Chairman.*] You set apart an insurance fund?—Yes.

4504. Is that allowed by the Act of Parliament?—No.

4505. Mr. *Floyer.*] In the course of your visits to the subway which you spoke of, have you often detected much escape of gas from the pipes?—No; I have not.

4506. Are the pipes under your management?—They are not; they are the property of the Local Board.

4507. At the time you visited the subway, do you remember any occasion in which you perceived any escape of gas from the pipe?—I have perceived it round the meter, but that was only a slight escape from the meter, and not from any defect in the pipe itself.

4508. Viscount *Galway.*] I think there must be some mistake with regard to placing these pipes in the subway, which you say you were required to do, but that will be explained at some future time. I want to know when you were required to put these pipes into the subway what were the terms?—It was intimated to us that we should have to pay a per-centage upon the construction of the subway.

4509. That is to say, a sort of rent?—Yes; a rent for the use of the subway.

4510. Was the cost of the subway especially named to you as one of the items?—It was.

4511. *Chairman.*] Was it in writing?—It was.

4512. Viscount *Galway.*] Have you got that writing?—Yes.

4513. Mr. *Richards.*] I understand it is not in the room now; but we will produce it at the next meeting of the Committee.

[The Witness withdrew.

Mr. *Horatio Brothers* called; Examined by Mr. *Richards.*

Mr. *H. Brothers.*

4514. You are the engineer, I believe, of the Equitable Gas Company?—I am.

4515. And have been so for some eight or 10 years?—Yes.

4516. Were you a gas engineer previous to that period?—Yes, 15 years previously.

4517. Making an experience in all of some 23 or 24 years?—Yes.

4518. Is Garrick-street, where one of the subways exist, in the district of the Equitable Gas Company?—It is.

4519. We are told that in that subway there are two 5-inch pipes now existing?—There are.

4520. For the supply of gas to the street?—Yes.

4521. Did you lay them in the subway at the request of the Metropolitan Board of Works?—We did.

4522. When you consented to lay them in the subway, did you stipulate that you should be permitted to bury the pipes so laid in the subway in earth?—We did.

4523. To that, I believe, the architect of the Board assented?—He did.

4524. Did you make that proposition, believing that it would be attended with less risk of danger than if they were less open and exposed?—That was one of my reasons.

4525. The Metropolitan Board of Works wanted your company to lay your mains in the subway on the surface, did they not?—They did.

4526. But you declined?—Yes.

4527. Why did you decline?—We declined to lay them on the surface, but we agreed to lay them, if we were allowed, in the soil of the subway, to which Mr. Marable, the architect of the Board, consented.

4528. When you say "the soil," do you mean that you wished to bury them?—Yes.

4529. Will you just state the reason why you wished to do that?—My reason was, that if they were buried in the soil, they would be less liable to danger from other parties, and that if there were any escape, it would be absorbed by the soil.

Mr. *Denison*, with the permission of the Committee, here took up the examination.

4530. You do believe, then, what some of the other witnesses, whose evidence I have read, do not believe, that an escape is absorbed by the soil?—I believe so.

4531. You have been in the subway in Garrick-street a great many times?—I have been in that subway.

4532. What is your opinion about its efficiency for the purpose for which it was constructed?—My opinion is, that it is not sufficient for the purpose, and that it is improperly ventilated. The reason I have come to that conclusion, which is one of the reasons I have laid the 5-inch main in the soil, was, that we have a subway in our works, or, rather, a covered way, where we have a 30-inch main and three 14-inch mains passing under the office and under the Board-room; and lately, with every care, we were very much troubled with a very great smell arising from these mains; in fact, so much so, that at times the Board-room was scarcely fit to sit in. In very severe weather I always find that some of the joints leaked, and to obviate that, I have covered all those mains with clay, and since then we have had no smell arising from them.

4533. *Chairman.*] Where are your works?—At Lupus-street, Pimlico.

4534. Mr. *Denison.*] You were there with this Committee last Friday?—I was.

4535. It was then, probably, in as good a condition as it could be?—It was.

4536. Did it alter your opinion at all?—Not at all.

4537. In laying on the service to houses from a main in a subway do you cut off the supply from the street?—In laying on the service from the subway in Garrick-street we cut off the supply entering from the street.

4538. Do you find that subway in Garrick-street is unwholesome at times?—It is.

4539. Do you think it is a place in which workmen can work for a long time without being the worse for it?—No; the workmen are obliged to come out into the fresh air, especially in foggy weather.

4540. What do you find the effect of going down there is in winter time?—In some weather you cannot remain down very long together.

4541. Is it damp?—It is damp, and there is no circulation of air.

4542. In short, the ventilation is altogether defective?—It is.

4543. You, I suppose, like other people, admit that it is possible to connect the mains in a subway without an accident?—There is no question that it can be done.

4544. But, on the other hand, do you believe there is risk of accident?—Of course.

4545. More so than there is in the case of pipes laid in the streets?—When you get an escape of gas in a confined area it is more dangerous than when there is an escape of gas in the street, because in the street it goes away.

4546. You do not mean that there is more risk of an escape from the pipe being in a subway; but the circumstances being the same, it is more likely to do mischieft in a subway?—That is what I think.

4547. Is what you are afraid of, that accidents may arise when ordinany jobs are done by workmen?—That is what we are afraid of.

4548. Do you consider that the subways, that are now constructed, are fair specimens of what subways would be if they became generally used and filled with pipes?—Oh, no; if a subway were constructed in Parliament-street, and other streets in our district, it would have to be equal to the whole area of the street.

4549. We have had several witnesses here quite laughing at the difficulty of getting any new mains into a subway; what is your opinion about that?—It is very

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very easy to lay mains in a subway; but the difficulty will be, when you have mains laid in a subway, to make any alteration, or to put in an additional main.

4550. Will there always be a much greater risk of accident or misfortune of one kind or another than there is in the streets?—Unless very great care is taken there will be greater risk; and if there should be an accident, it would be attended with much more serious consequences in a subway than in the street.

4551. We are told it can be done by means of those reflectors of which we have heard, without any artificial light; do you think it can be done in that way?—Those reflectors are very good things in their way, they give a general light; but you would require to have an artificial light in addition, at the particular points at which you are making a joint.

4552. Do you believe that the same work can be done in anything like the same time that it can be done in the open air?—Practically we find that it is not the case. They take longer to lay pipes in a subway than they do in the street. A man working in the street is, I may say, open to the general supervision of the public; but when he is in a subway, he may waste his time to any extent he pleases.

4553. Is it more easy to scamp the work, to use a short word, in a subway than it is in the open air?—That is so; because there is not the same supervision over the men that there is in the street.

4554. Besides laying down mains, there are various other things to be done, such as putting on branches, repairing, and so on; will that sort of work be more difficult?—It will be more difficult and more dangerous.

4555. Do you believe it is possible to make any provision, in the first instance, to meet all probable contingencies that may happen with regard to the requirements for future pipes, and so on?—I am certain that subways which are constructed, are no criterion of what will be required in the great thoroughfares of London.

4556. Suppose you had to lay down a large new main in a subway which was already tolerably full, how would you go to work to do so?—That would entirely depend on the number of mains already in the subway. It appears to me from what I see, if you have anything like any quantity of mains in the subway that it would be impossible to put an additional one in; you must put it in the centre and block up the gangway. Some of these pipes are of large diameter.

4557. We have been told some of these pipes weigh three tons; how would you go to work to put in a pipe of that kind?—If we had a new subway with no pipes in, there would be no difficulty, but with the pipes in, it would be a most difficult and expensive operation.

4558. You mean then that it would be absolutely necessary to break through the crown of the subway in order to do so?—It would.

4559. In the Southwark-street subway there is one large 18-inch main, which lies upon what are called cradles, and there is a smaller one lying between that and the wall, on the ground?—Yes.

4560. Are those mains in use now?—They are charged with gas now.

4561. Supposing it was necessary to remove the smaller one, the one nearer the wall, how would you be able to do that?—It appears to me from what I saw, that it would be a very difficult operation to do that, except the larger one was removed.

4562. Are there services branching out now?—No; they are simply put there as an experiment.

4563. They are there only as an experiment; they are not services laid down?—No.

4564. Are the gas mains, as far as possible, always laid on an inclination to admit of their draining themselves?—Yes; the gas mains are laid on an inclination to drain themselves.

4565. What is the lowest rate of inclination that you adopt?—That very much varies with circumstances; we give them a fall, and in some cases we are satisfied with half an inch in 10 or 20 yards.

4566. Applying that to the Southwark-street subway, which is 3,290 feet long, what inclination should you want from one end to the other?—That I have not gone into. I do not think an engineer laying a pipe there would lay it with an inclination all one way; he would break the fall. I think a former witness went into that.

4567. Now upon the question of the gas escaping and ascending, we have had various theories about that; do you think the gas in rising would mix with the air?—It does not go in a straight line; it forms a sort of curve and mixes with the atmosphere around. If you take a section of that subway, I consider that 100 feet of gas would cause a most explosive compound for a certain distance; and there would be no ventilation, and consequently a person going in with a light would blow the subway up.

4568. Do you believe in the theory of the gas simply rising?—It would not in this case, there is no ventilation to take it out.

4569. You could not very well use a crane for putting the pipes into the subway, could you?—No, we could not; it would all have to be done by manual labour.

4570. That is, it would have to be got in at one end and worked along, as it could be?—Yes.

4571. Do you anticipate any danger from the things falling, in the subway, on a small pipe?—We know, as a matter of fact, that men going into subways are, ordinarily, careless, and that the workmen of any other company, for example the water company's men, going in that subway would pay little attention to our pipes; consequently we might have a fracture, and there might be an explosion.

4572. They use a number of heavy things, and bang them about, I suppose?—They do.

4573. I think some of the witnesses have already explained with reference to putting in ladders; have you anything now to mention upon that point?—No; I corroborate the testimony of the former witness with reference to that.

4574. If gas escapes in the streets, how do you deal with it; you throw soil upon it if there is a flame, do you not?—Yes, of course, if there is a flame we put it out by soil; if there is an escape, and it mixes with the atmosphere around, it is not dangerous.

4575. But suppose it got on fire from a large leak, or a large opening, in the subway, would it soon become too hot to do it?—Yes: the joints would become too hot to allow of any person to go in and remedy the defect.

4576. We have had some gentlemen saying that an escape of gas can be easily detected by discolouring whitelead?—That would not be so, because the gas, as it leaves the company's works is tested; I may say, in every case, that it would not discolour whitelead, or the ordinary test by sulphur.

4577. Do you agree with the other witnesses who disagree with Mr. Carpmael on the subject?—I do.

4578. Now, as to detecting an escape of gas by the smell, a long way off, you cannot tell in what particular place the defect is?—I can detect gas by the smell; we do not generally detect it by any other means.

4579. Does it enable you to find at what particular place it is in?—It would to a great extent.

4580. When it is in the street it does?—Yes.

4581. When it is confined in a subway, is the smell the best test?—A light is the best test, but that would be a dangerous one in a subway.

4582. Do you say also, as others have done, that there are explosions now which produce no bad effect, because of their occurrence in the open air?—Yes; there are many.

4583. They are rather in the nature of puffs, I suppose, in the open air?—Yes.

4584. And a great many occur in sewers also, do they not?—Yes; I have not had much experience of that myself, but I have read of such, and I have heard of such.

4585. It may be said that all things are liable to accidents, do you think that where an accident could be avoided, by leaving things alone, that it would be very imprudent to incur the risk of it?—I think so.

4586. You know something about the attempts that are being made to drive the London gas companies out of London?—Yes.

4587. If the London gas companies are driven out of London, will every subway be a kind of gasholder on its road?—Yes; it will.

4588. As to shutting off the supply of gas every time you wanted to do anything

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thing in the subway, would that be very much complained of?—That would be very much complained of; we give notice to parties taking gas in the street before we do such a thing, and they complain of it very much.

4589. Would that be aggravated by having to do it in a subway?—We do it in the subway only; we only do it in the case of Garrick-street.

4590. That is not your practice when the pipes are laid down in the streets? —No.

4591. Some witnesses have told us about private passages and subways, and things of that kind; you have partly given your opinion on that; you have said that you have some yourselves in your own works?—Just so.

4592. Have you any other experience of them besides?—I have not.

4593. Do you believe that in many of the large thoroughfares of London the mains could possibly be got into the subways?—Not unless the subway was as wide as the street or the roadway.

4594. Even now in some of the streets you have hardly sufficient room?—We have hardly sufficient room in many streets, such as Parliament-street, where the companies' mains pass.

4595. The subway must necessarily be smaller than the street, I suppose?—Yes.

4596. Now, as to the expense of the subways; we have had Mr. Bazalgette's evidence about the expense; if they are to be further extended would that be an enormous increase upon the metropolitan burden?—A very enormous increase.

4597. If, on the other hand, you are to pay for them, that will come back upon the consumer by virtue of the dividend clause?—Yes; in the amount of rent charged.

4598. Now, about responsibility; do you see any way to the companies undertaking the responsibility of maintaining pipes in subways?—No; I think that the companies, seeing that they have Parliamentary power for laying their mains in the streets, if the Metropolitan Board of Works come for power to compel them to lay their mains in the subways, they ought to be at the expense of re-laying them, and also the responsibility attaching to them.

4599. Mr. Rodwell said, the other day, that if the Metropolitan Board of Works did any mischief, that they would be responsible, do you think practically that would be the case?—I do not know much about legal points, but I think there would be great difficulty in enforcing that, owing to the difficulty of tracing the source.

4600. Before any company could be fixed with the responsibility it must be proved which did the mischief?—Yes; we have great difficulty now, in the cases of escape in the streets in which other companies pass in tracing the escape to our mains or to the other companies' mains.

4601. Do you find in your experience that juries are apt to assume that companies have done the mischief?—Gas companies are generally assumed to be in the wrong.

4602. Especially when there is an escape of gas?—Yes.

4603. I suppose a single accident might sweep away your profits for a long time?—That might be so; the destruction of life and property would be a very serious thing, and would very much affect our profits.

4604. Now, about your own pipes, have you laid down all the mains as far as you know, that will be required for your district at present?—We have.

4605. Subject to any extension further out, you do not think that you will require to make any great addition to the mains in your district?—No.

4606. Therefore you object to the expense of taking them up and putting them down in another place?—We do, decidedly.

4607. I forget whether you were examined in 1864?—Yes; I was examined in 1864.

4608. Has anything that has occurred since 1864 altered the opinion which you then gave of the Bill?—Not at all; on the contrary, what has occurred since has rather confirmed what I then stated.

Cross-examined by Mr. *Cripps.*

4609. You seem to think that it is a very hard thing to compel you to take up your pipes, and put them down again, and that you should be at the cost of doing so?—Yes.

4610. Can you suggest anything fairer than that an arbitrator should determine who is to pay for the cost of the removal?—I do not see that it is a case for arbitration at all, because we have a legal right to the soil in which our pipes are laid, and another party comes forward and says, "we are going to make a subway and you shall put your pipes there."

4611. Can you see anything fairer than that, if the two parties differ, an arbitrator shall settle which is to pay?—I do not see that it is a case for arbitration at all.

4612. Can anything be fairer than an arbitrator deciding what, if anything, should be paid?—If there is any doubt as to which is the right party to pay, of course an arbitration is the best means of deciding it.

4613. Can you suggest to the Committee anything fairer than that we should leave the matter to an impartial arbitrator?—Yes; I would suggest that the parties requiring the pipes to be removed should pay the cost of it; that is what we do in all private matters.

4614. If we ought to pay the cost, would not the arbitrator take that into his consideration as one of the principal elements of his decision?—If you appoint an arbitrator, it is generally a disputed question of liability; but, in this case, I cannot see that there is any question as to liability.

4615. You do not think an arbitration would be fair?—No; I think the system is altogether unfair, of making us take up our pipes, where they have been already laid with Parliamentary sanction, and put them in another place where we should be liable to accident, and also put to great expense.

4616. Can anything be fairer than leaving it to the arbitrator to say, under all the circumstances, who should pay the costs of that?—I do not think it is a case for arbitration at all.

4617. You do not think a jury any better than an arbitrator?—My opinion is formed from the reports that I have heard.

4618. You do not like an arbitrator, and you do not like a jury, to decide the matter; can you suggest any other tribunal?—I cannot suggest any tribunal at all.

4619. In order to fix you, or any party, with responsibility for accident, some negligence must be proved to have taken place by you?—Yes; in the case of subways, where there are two or three gas companies, there would be the risk of an escape of gas, and the great difficulty would be to prove from which company's main that arose.

4620. That would be a difficulty which the unfortunate public would be under of knowing which company was liable; but, if anything, that would make it rather better for the companies, because the claimant would have to prove his case against the gas company?—It would, no doubt, be more difficult to prove the case against a particular gas company, but not against all the gas companies, because we might all be indicted for a particular act.

4621. Now, you say there is hardly room in the streets for the mains at present. What are you to do in the case suggested by my friend, when a large new main is required to be laid down?—That applies to some streets only.

4622. You have told us some street in which there is hardly room at present?—I named one, namely, Parliament-street.

4623. What would you do there if you had to lay down a new pipe?—We have a 38-inch main in Parliament-street, that is our trunk main; we should hardly want a larger main than that.

4624. I mean, supposing you wanted to put down an additional main there, what would you have to do?—We should have to do it in the best way we could, under the circumstances.

4625. You must go over the existing mains or remove some of them?—If you put to me the special case of my company, I should take up one of our 14-inch mains, and put down a 38-inch main.

4626. Is there any other limit to the size of a subway than the breadth of the street?—

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street?—No; that is what I say; in some thoroughfares you would have to make the subway as wide as the street.

4627. That is to say, wherever there was a large use required of the subway, you would have to make a large subway?—Yes.

4628. Would not any engineer before constructing a subway, take care to ascertain beforehand, what the probable use of it would be?—I should think he would consider that question before constructing the subway.

4629. You have spoken of your experience, have you from time to time been down the Covent Garden subway since 1864?—I have not been much down the Covent Garden subway.

4630. Have you had access to it?—Yes.

4631. At any time you thought proper?—Yes.

4632. Since 1864?—Since the time we first laid our pipes in it.

4633. You might have gone down there without giving any notice to the Metropolitan Board of Works?—Yes; at any time we thought proper.

4634. Now, with regard to cutting off the gas, is it the fact as we have had stated here, that the companies are always sending men with pickaxes round to cut off the gas from people who do not pay their rates?—Yes; for this simple reason; if you go into a customer's house and cut off the gas, you are liable to an action for trespass, therefore you are obliged to do it from the outside.

4635. Therefore you are obliged to pick up the street to cut off a man's gas when he does not pay, or will not pay?—Those are exceptions.

4636. But you send bodies of men round to do so?—We do not send bodies of men, we send one man.

4637. You have men constantly employed going about for that purpose?—Yes.

4638. Taking the subway in Covent Garden, you could send a person down into the subway, turn off the cock there, and so cut off the gas?—We could not cut off the gas in that way in the subway. We lay a main in the subway and have a branch from that with two services. If we did that we should really commit the very thing which we do not want to, we should go into the person's premises and commit a trespass.

4639. You could get to the pipe from the subway?—But then we should be cutting off the supply from both customers, we should be punishing the innocent for the guilty.

4640. You could go into those lateral passages?—The intention of those lateral passages is simply to lay one service pipe and branch from it. The services would be outside the lateral passages, and inside the premises of the consumer, so that if we turned the cock off in the lateral passage, we should punish one person for the fault of another, because we should cut off the services of two customers.

4641. There would be no difficulty, would there, if it was thought desirable, of disconnecting the pipes in the lateral passage?—I do not say there would be any difficulty.

4642. If that were desirable in the parts of London where you are in the habit of cutting off gas, you could do it simply by turning off the cock?—Yes; but you must remember this, that if you had a cock always open and not turned for some considerable time, when you came to turn it you would find it so fast that there would be a possibility of wrenching the cock, and so dissevering the service, and then the gas would escape.

4643. Do you mean to tell me that it is easier and would do less damage by the pickaxe than by turning this cock?—No; I am only showing you the difficulty of the other operation and the danger of it.

4644. Comparing your plan of doing it with a pickaxe with the mode of turning off the cock, which is the easier of the two?—If the cock could be turned perfectly easy it would be the easiest method to go into the subways and turn the cock off.

4645. If the cock were to stick, you could resort at last to the pickaxe?—No; you do not want the pickaxe in the subway.

4646. You mentioned that you found the cost of laying pipes in the subway more than the cost of laying pipes in the streets?—We did.

4647. Have you got any paper at all showing what the items of the cost in either case were composed of?—I have not; I may say that when we laid these pipes, we unfortunately did not take any particular attention of the items, but we came to the conclusion, long before 1864 or the present time, that it was more costly to lay the pipes in the subway than in the open street.

4648. Was that without having before you the particulars of the cost so as to compare the two?—We arrived at the general idea from the amount of labour done, and the time it took to perform it.

4649. Then all you had to go by was a general idea?—It was a general idea, I admit.

4650. Viscount *Galway.*] Was the street macadamised or paved?—The street was paved.

4651. Mr. *Duff.*] Are you comparing it with a macadamised street or a paved street?—A paved street.

4652. *Chairman.*] You mean taking the pavement up, cutting the trench, making it all good, and replacing the pavement?—Yes.

4653. You think that would be less costly than laying the pipes in the subway? —Yes; the amount of labour was not anything like what we should have had in the streets.

4654. Mr. *Cripps.*] You cannot give me any particulars of the cost?—No.

4655. Was it done by daywork?—We were very particular over it; it being a new thing I was most particular, and took greater precautions. I think the Committee will arrive at the conclusion that the pipes are well laid there. I contend that they are laid as well as if they were laid in the street. They are laid in the subsoil, and have all the advantages of being so laid.

4656. You say it is more easy to have supervision out in the open air than in a subway?—Yes.

4657. In a subway you might take any time you pleased for the purpose of doing you work?—Yes; that is what I complain of.

4658. In the street you are obliged from the exigencies of the traffic to do it as quickly as possible?—Yes. If I send out a gang of men to do a job in the streets, they do not know but that every passer-by is either a director or a shareholder, and they more or less attend to their work; but if you send them down a subway, they may take any time they like because there is no inspection.

Re-examined by Mr. *Denison.*

4659. All these things which my learned friend has been putting to you, with regard to tribunals, arbitrations, and juries, assume that there is a fair question to be tried?—Just so.

4660. But according to your view, you having Parliamentary sanction for laying you pipes in the street, there is no question to be tried?—No.

4661. Then he thinks it will be more difficult to fix any gas company, with the risk of damage, in a subway than it is now; but what you say is, that if there are two companies in the subway it would be very difficult to prove that the damage was the act of one?—Exactly; in many cases there would be only one.

4662. Have you any doubt, from your experience of juries, that it would be very difficult to make juries believe that it was not the fault of one?—I am certain a jury would always come to the conclusion that it is the fault of one.

4663. It might very easily turn out where there were two companies, that although of course one company must be responsible, still the jury might find that the wrong company was responsible?—Yes.

4664. The workmen of the other company might have done the mischief?—Yes.

4665. Or even the workmen of the water company might have done the mischief?—Yes.

4666. Or the workmen of the telegraph company, or any other company, that happened to have pipes there?—Yes.

4667. All the jury would know would be that it was the pipe of one company from which the escape would take place, but, which did the damage they could not tell?—No.

Examined by the *Committee.*

4668. Mr. *Jackson.*] I gather from you that you think if the companies have Parliamentary powers to use the street, they ought not to be deprived of that Parliamentary

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Parliamentary right, and in addition have to pay the cost of any alteration?—That is my opinion.

4669. Do you go so far as to say that in addition to the cost of transposing the pipes from where they are to this subway, they should pay nothing for the use of the subway?—That is my view.

4670. Viscount *Galway.*] Have any terms been proposed to you in any way?—No.

4671. *Chairman.*] You have not been called upon to pay anything?—No, we have not.

4672. Was anything suggested in the first instance?—I am not aware; I think the Metropolitan Board of Works were anxious to have the mains, if we would lay them.

4673. To have the experiment tried?—Yes.

[The Witness withdrew.

Dr. *Percy* being in attendance, the Chairman suggested that he had better be called, in accordance with the arrangement which had been made the other day.

John Percy, Esq., M.D., called; Examined by Mr. *Wilkinson.*

J. Percy, Esq., M.D.

4674. You are a Civil Engineer, I believe?—I do not lay claim to that title.

4675. I am aware you are a practical chemist. You are the officer in charge of the lighting, warming, and ventilating of the Houses of Parliament?—I am.

4676. In addition to that official knowledge, you have a practical acquaintance with the working of coal mines?—I have had, during many years, in South Staffordshire.

4677. Have you considered the proposal now presented to the Committee to lay gas and water mains in subways?—I have.

4678. Will you be kind enough to express your opinion upon that?—I believe it is quite feasible. I wish to state that I am here as an independent, unpaid witness, to state exactly what I think on the matter.

4679. *Chairman.*] Have you seen the subways?—I have.

4680. Mr. *Wilkinson.*] I believe you have inspected both the Southwark-street and Garrick-street subways?—No; only the one in Southwark-street. Then, if you will allow me, I will express my opinion in as few words as I possibly can. There is no doubt that it is one of those questions on which a good deal may be said on both sides. Half a dozen men of eminence may be found giving an opinion on one side, and half a dozen men, equally as eminent, may be found giving an opinion on the other side. It appears to me that there is a most admirable apparatus for the purpose of testing the opinions which have been stated with regard to this matter. You have here the very thing at hand. You may make an experiment without danger, and at little or no cost, and so ascertain which of these opinions are correct. I should recommend that a gas pipe should be tapped; that there should be competent observers provided with safety lamps; that Mr. Ansell should be there, with some attendants, with his indicator, by means of which you can ascertain with the greatest ease the exact amount of gas in any part of the subway. I should recommend that the main be tapped, and the gas be allowed to flow out, and then it will be seen how long it takes for a given quantity of gas to diffuse itself. That seems to me a very simple expedient, and one which would go to determine this doubtful point. I do not know whether I have exceeded my proper duty in making a suggestion of this kind. In the course of my life I have had occasion to hear the opinions of a great many what are called "experts," and, as I said, you may get half a dozen very eminent men to express an opinion on one side, and another half dozen equally eminent to express an opinion on the other side. The only way in which it appears to me you can determine the matter with accuracy, is by an appeal to an experiment, such as I have suggested, where you have the means of testing each opinion with perfect accuracy and certainty.

4681. Mr. *Paull.*] Would it occur to you, that prior to asking Parliament to give compulsory powers, that this experiment ought to be made?—If there is any doubt on the point, I should think it would be desirable to have the experiment made. It would not take more than two or three days.

4682. What should you think if Parliament were to grant compulsory powers before such experiments were made to your satisfaction?—I think it would be more prudent to make the experiment first, under the circumstances, seeing that there is such a difference of opinion.

4683. *Chairman.*] Would you undertake them?—I would not undertake them, but I should have no objection to show that I am not under the least apprehension of danger by being present; I have so many things on hand just now that I could not undertake them, but I should be willing to form one of a number to attend while they were being made.

4684. Of course, if it were decided that the experiment should be made, there must be somebody to attend to represent those who support the Bill, and somebody to represent those who oppose the Bill; there must be an engineer on both sides?—Yes.

4685. Mr. *Wilkinson.*] Independently of any experiment of that nature, may I ask you whether, from the knowledge you have formed upon the subject, you think there is any practical danger?—Under ordinary conditions I should think there is no practical danger. My impression is, that if in the crown of the arch there were openings of sufficient dimensions that, owing to the natural conditions, there would be sufficient interchange to cause a sufficient ventilation; that is my impression.

4686. When you say that is your impression, do you know that the subways are 12 feet wide and six feet high, with openings in the crown?—I was told they were 80 feet in length.

4687. Assuming that to be their condition, you consider that the ventilation is sufficient?—Under ordinary circumstances I think it would be.

4688. What is your opinion as to the diffusion of gas?—There is no doubt that gas, by virtue of its specific levity, compared with air, does tend to rise in the same way as a balloon rises through the atmosphere; nevertheless a certain amount of diffusion takes place. It has often struck me, in testing the gas in some of the great roads of Staffordshire, where the ventilation is carried on without any openings at all, by means of two shafts; I have watched the escape of gas, and heard it emitting the usual sound, and I have been very much struck at seeing how rapidly that gas accumulates at the top of those great roads, and how long it remains there, in spite of what I have read and seen with respect to the laws of diffusion. The element of time, it appears to me, is a very important element in the comparison.

4689. May I take it to be your judgment in speaking of what you have called the laws of diffusion, that any leakage of gas would speedily rise to the top and escape through those gratings?—In the case of any great leakage, I should say that it would be so; that is my impression.

4690. That would be increased, would it not, by the fact that the gas would escape from the pipes under pressure?—I do not know whether that would make any difference.

4691. Is it your opinion that the suggestions which we have heard here, as to the great increase of danger from subways in the mode of laying pipes, are not well founded?—Of course in any emergency of that kind there is no doubt at all about the fact that you render the atmosphere in the subway more or less explosive. I take it, those emergencies are not frequently occurring; it is a very rare occurrence if the engineering work is properly done. We have had accidents, it is true, in the Houses of Parliament, of that nature, from very special causes. There would not be the slightest difficulty in applying artificial ventilation, even to the extent of 30 or 40 miles; not the slightest in the world. There are some collieries now in which the air travels about double the number of miles before it escapes; there is no difficulty whatever in ventilation.

Mr. *Denison.*] I do not think I need cross-examine you.

Examined by the *Committee*.

4692. Mr. *Jackson.*] I gather it to be your opinion that the greater the body of gas which was emitted from a fracture in the pipe, the sooner it would find an escape?—It is just the difference between the specific gravity of the air and the gas, *J. Percy*, Esq., M.D.

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gas, and according to that difference will be the ascent. I am not prepared to give any numerical statement with regard to that. I was talking to one of the Members of this House the day before yesterday, Captain Vivian, and he suggested what I think is a very good notion, that the arch or groove between two consecutive openings should be made to incline a little upwards towards each of the openings. I think that would be a very advantageous arrangement.

4693. Viscount *Galway.*] As subways are at present constructed, would it be the case that where an explosion took place it must always be a terrific one?—Certainly not. A difference of opinion may attach to that expression, "terrific explosion;" it is difficult to say what a terrific explosion is.

4694. *Chairman.*] Would it blow up a house?—Certainly it would not. I happened a good many years ago to have my attention directed to an explosion of gas which occurred on the London and North Western Railway, in Birmingham. It must have been 20 years ago, but I am not certain of the exact time. I was curious enough to take a photograph of it. There was a viaduct, and the arches were enclosed so as to form a very large chamber, into which the gas had leaked, and the whole atmosphere of that chamber had become explosive, and an explosion took place; I think it was from the passing over of a locomotive one morning. The effect was not to blow up the railway, but merely to blow out the sides, and comparatively little damage was done. I cannot understand damage could be done to the houses, except perhaps a few bricks being blown down.

4695. Mr. *Floyer.*] I suppose there is no doubt that if gas escapes in a subway and mixes with atmospheric air, that there will be a liability to explosion no doubt; even if the experiments were to be made, they would prove nothing more than that there was a liability to explosion?—No.

4696. Then if you were to make the experiment, you would only be able to determine the degree of liability to explosion, and you would ascertain how far the gas would, under certain conditions, travel in a given time, and to what extent the air would become explosive?—Just so.

4697. You would also ascertain how long it would be in getting to that point?—Certainly I should.

4698. Viscount *Galway.*] You would be able to test what ventilation there was in the subway?—I should.

4699. Mr. *Duff.*] In a case where there was a down draught in both ventilators, and the gas became mixed with the atmospheric air, the gas would accumulate at the top of the subway?—You may see the hot air ascending, and, in the same ventilator, the cold air descending.

4700. I am supposing that there was a down draught in two successive ventilators, and that the gas had got to the top of the subway between those two ventilators, then your experiment would be to test how long that gas remained there?—Yes.

> *Chairman.*] Are the Promoters prepared to accept the proposition of Dr. Percy; do you object, Mr. Denison.
>
> Mr. *Denison.*] I cannot object to your making the experiment, but I shall certainly object to going personally myself.

4701. Mr. *Floyer.*] You say the liability to explosion, and the magnitude of the explosion, must depend upon the amount of gas that there is escaping from the pipe?—No doubt.

4702. An escape may take place from a pipe of any conceivable amount under any conceivable circumstances that may ever arise?—Of course it may. There has been a great deal more said about this leakage than there is any occasion for.

4703. No experiment which we could make would meet all the possible cases of leakage which might arise in subways?—I think it would meet a great many of them; of course I could not say that it would meet all possible cases. The great source of danger appears to me to be from leakage. There was a case occurred in the Houses of Parliament, about a year and a half ago, with reference to one of the gas mains which entered the basement, when the gas was under a pressure of twenty-tenths. It became fractured in some way, and it was very difficult to find out where the fracture was. The consequence was that the lower part of the House was filled with gas, there was a bit of an explosion, but no one fortunately was injured. It got up so far as the library, and if it had gone on and had not been discovered, the House might have been blown to pieces. I very much doubt whether in the case of such a leakage in a subway provided with a number of openings, it would not be very difficult to render the gas explosive; it is my opinion that it ought to be tested by an experiment.

4704. Mr. *Bagwell.*] One of the witnesses stated yesterday, with reference to making shafts to ventilate the subways, that it would be necessary in order to make those shafts available, to shut up all the openings in the top of the arch; what is you opinion with reference to that?—I should say quite the reverse; I do not see any necessity for that at all. It depends, of course, upon what your object is. If you have to show what is the cause of the circulation of air in every part of that arch, if you were to have very large openings near the arch, of course the air would rush down those openings, and the further part would not get properly ventilated; you must have air admitted at intervals, taking care properly to regulate those openings. It all depends on that. You might ventilate a shaft 30 miles long by exhaustion.

4705. We will take it for granted that this subway is to be ventilated for a distance of 80 feet, and that there is to be ventilation under the kerb for each of the side chambers; do you think with such a ventilation as that, that there would be any necessity for the shafts?—The shafts are of no use only when you want to vary the temperature. There is always a great variation going on from shafts; the external temperature, or the internal temperature rather, like that of the Southwark-street subway, is just in proportion to the degree that the temperature is varied by the amount of ventilation which is obtained.

4706. The ventilation would depend, no doubt, a great deal on the current above?—To a great extent it would.

4707. *Chairman.*] Would it depend much upon that?—A high wind would tend very much to promote ventilation.

Mr. *Jackson.*] Mr. Hawksley, would you have any objection to be one of the parties who attend while this experiment is made?

Mr. *Hawksley.*] No, not at all. If you can only insure fair wind and weather, I will go with pleasure.

4708. Mr. *Paull* (to the *Witness*).] You suggest that the experiment should be made?—Yes.

4709. It is now suggested by the Chairman that a Committee should be formed to witness these experiments?—Certainly.

4710. I do not recollect that you mentioned the nature of the experiment that you would try?—I should tap that gas main, and then I should see how far it was possible to render the atmosphere of that place explosive. There is no occasion for you to make an explosion at all. What you have to do is to get Mr. Ansell to assist with his indicator. He will be able to give you, by means of that dial, in a moment or two, the exact per-centage of gas to the air.

4711. Mr. *Denison.*] How long would it be necessary to keep the road open?—I should think two or three days, in order to settle the question, if you get the right men to do it. Mr. Ansell is one of the men I should name.

4712. You would leave it open two or three days?—You cannot exactly tell how long it will take to make the experiment, but I should think it might be done in three or four days.

4713. Do you think it would make any difference whether a hole was made in the middle of the subway, or in one of the side passages?—Probably it would be desirable to make a hole in both.

4714. They would be affected rather differently, would they not?—Very likely they might be.

Chairman.] There is a difference of opinion amongst the Members of the Committee as to whether the experiment should be tried, and we wish to clear the room in order to settle the matter.

Witness.] I shall be happy to show you an experiment by Dr. Ansell's indicator.

4715. *Chairman.*] You say from your experience as a very practical chemist, that

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that without exploding anything there are means existing by which it can be ascertained whether the mixture has reached an explosive state or not?—Undoubtedly; there is not the slightest doubt in the world.

The room was ordered to be cleared.

After a short time Counsel and the parties were called in.

Chairman.] I am requested by the Committee to state that if the promoters choose to make these experiments under the guidance of Dr. Percy, and give the opponents of the Bill a fair opportunity of attending to see the experiments performed, the Committee will be ready to hear Dr. Percy on Tuesday, and to take his evidence with regard to the experiments.

Mr. *Clerk.*] Might I respectfully ask what the experiment is to be?

Mr. *Bagwell.*] Any experiment they choose to make which will promote the inquiry.

Mr. *Wilkinson.*] Are we to understand on the part of the promoters that it is the desire of the Committee that the experiment should be made, or is it left to our discretion whether we should make the experiment?

Chairman.] It is left to your discretion to a certain extent. We think the evidence of Dr. Percy is not complete without the experiment.

Mr. *Paull.*] I cannot confirm that. If Dr. Percy's evidence is not complete without making the experiment, let him make it and give us the result.

Mr. *Wilkinson.*] I now wish to have clearly before the minds of the promoters the exact condition of the thing, whether it is left to them *ex proprio motu*, or whether we are to understand that it is the desire of the Committee that that experiment should be made in order to give them the fullest information.

Chairman.] The Committee do not give any opinion on the latter point, but leave it to the promoters to take such course as they may think fit. What other evidence have you, Mr. Clerk?

Mr. *Clerk.*] There is the evidence of one other gas engineer, and I believe with the exception of that one, we shall not want to trouble the Committee any further.

Mr. *Bagwell.*] Then naturally would come the summing up on Tuesday.

Mr. *Clerk.*] I should hope so.

Mr. *Floyer.*] Perhaps Mr. Clerk will wish to call evidence in opposition to the experiment.

Mr. *Clerk.*] The experiment may be utterly futile.

Mr. *Floyer.*] Of course it will be open to the opponents to have counter experiments made.

Chairman.] We will now adjourn till Tuesday, at 12 o'clock, in order to give an opportunity for the experiments being made.

[Adjourned to Tuesday next, at Twelve o'clock.

Tuesday, 9*th July* 1867.

MEMBERS PRESENT:

Mr. Bagwell.
Mr. Duff.
Mr. Floyer.
Viscount Galway.
Mr. Grove.
Mr. Jackson.
Mr. Cornwall Legh.
Mr. Paull.
Mr. Tite.

WILLIAM TITE, Esq., in the Chair.

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Mr. *Rodwell.*] Possibly, Sir, it would be convenient to state the course which has been adopted by the Metropolitan Board of Works since the last meeting of the Committee on Thursday. We have, in consequence of the evidence given by Dr. Percy, and in consequence of what fell from the Honourable Members of the Committee, had experiments carried out according to Dr. Percy's directions, and they were carried out even beyond what he suggested. He being unable to attend himself, in consequence of his various engagements, deputed Dr. Frankland, who has been called before you, and whose eminence as a scientific man is not questioned, to attend there; and Mr. Ansell, and other gentlemen, have conducted a series of experiments, which were concluded yesterday, in the presence of Dr. Letheby, Dr. Odling, Mr. Hawksley, jun., and one or two other people who represented our opponents upon that occasion. We had Mr. Ansell, Dr. Frankland, Mr. Hemans, and Mr. Bramwell and others, and a large series of experiments were conducted. What I propose to do now, subject to your approval, is this, to put Dr. Frankland at once into the chair, and let him state precisely what was done, and what took place, and if my learned friends like to examine him, or if they like to call Dr. Odling, or Dr. Letheby, or Mr. Hawksley, jun., or any of those persons who were at the experiments, and had an opportunity of seeing the experiments, and who wish to dispute the accuracy of the experiments, I shall not object to their doing so. I put myself in the hands of the Committee entirely. What I propose to do now is to call Dr. Frankland, and let him give a narrative of what took place.

Chairman.] Do you object to that Mr. Denison?

Mr. *Denison.*] No, Sir, I have no right to object; but you must not take me as admitting that Dr. Frankland is the representative of an impartial body.

Mr. *Paull.*] What has become of Dr. Percy?

Mr. *Rodwell.*] Dr. Percy is not here at this moment; he is a person whose engagements are so numerous that it is difficult to get him. We went in the first instance and entreated him to conduct the experiments, and he said that it was impossible that he could do so, but that Dr. Frankland was as perfectly competent to conduct them as himself. He referred us to Mr. Ansell, and Mr. Ansell and Dr. Frankland are the persons who conducted the experiments; they will satisfy you or not, as the case may be, that those experiments were conducted fairly, and that they were or not conclusive upon the point.

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Chairman.] You proposed to call Dr. Frankland?

Mr. *Rodwell.*] Yes. Dr. Frankland saw Dr. Percy before he went there, in order that he might have his express instructions as to the precise mode of conducting the experiments.

Mr. *Denison.*] I merely say this, that I have no right to object to any evidence which my learned friends offer, or which you think fit to receive. I say no more than that. I protest altogether against receiving Dr. Frankland as the representative of Dr. Percy. Dr. Percy came here and described his own position, and it is extremely different from Dr. Frankland's. I cannot help your giving that evidence.

Viscount *Galway.*] Dr. Percy distinctly stated that he could not attend.

Mr. *Jackson.*] It was also distinctly understood that Mr. Ansell should be the party, and I put the question to Mr. Hawksley, senior, whether he would be the proper party to go, and he said that he would.

Mr. *Rodwell.*] If you refer to question 4710, you will see that Dr. Percy says, "What you have to do is to get Mr. Ansell to assist with his indicator; he will be able to give you by means of that dial, in a moment or two, the exact per-centage of gas to the air." And then, in another place, he says, "I would not undertake them, but I have no objection to show that I am not under the least apprehension of danger by being present. I have so many things on hand just now, that I cannot undertake them, but I should be willing to form one of the number to attend whilst they are being made." That is his evidence, Sir.

Dr. *Edward Frankland*, called; Examined by Mr. *Rodwell.*

Dr. E. Frankland.

4716. Had you an interview with Dr. Percy upon the subject of experiments at the Southwark-street subway?—I had on Saturday last.

4717. Did you learn from him what the object and nature of those experiments was which he wished made?—I did; I ascertained his wishes with regard to the trials which he would like to have made.

4718. When did you commence your experiments; at what hour?—About three o'clock on Saturday.

4719. I prefer now, if you will state to the Committee, having given that introductory matter, who were present at the different times during the experiments, and then state in your own way what was done?—We began on Saturday.

4720. *Chairman.*] Who was there, is the first question?—On Saturday, Mr. Bramwell was there, Mr. Easton, Mr. Dugald Campbell; that was all, I think.

4721. And Mr. Ansell?—Yes; and Mr. Ansell.

4722. Mr. *Rodwell.*] Mr. Hemans?—Yes; Mr. Hemans.

4723. Will you state what was done on Saturday?—On Saturday we made openings of various sizes in the mains, and ascertained then the per centage of gas near the crown of the subway.

4724. *Chairman.*] Was that the Southwark-street subway?—Yes; the Southwark-street subway.

4725. You made openings in the mains?—Yes.

4726. Were those openings allowing gas to escape?—We made openings in the mains.

4727. Of what size?—The first opening we made was 3-16ths of an inch in diameter, and the gas was allowed freely to escape from those openings.

4728. How far was that from the ventilators?—That was midway between two ventilators, the ventilators being, I believe, 80 feet apart.

4729. Mr. *Rodwell.*] How many of those openings did you make?—We first experimented upon this single opening of 3-16ths of an inch.

4730. Was the size of that opening made in accordance with the directions of Dr. Percy; did he give you the sizes of the openings?—The experiments that were made in accordance with the directions of Dr. Percy, were made yesterday; I think

I think it would be better for the present to confine ourselves to the experiments which were made yesterday, which were witnessed by everybody.

4731. State the experiments that were made on Saturday?—I have not got a note of Saturday's experiments, because they were preliminary to the others.

4732. *Chairman.*] From your memory state?—I can state substantially what they were; we then went on to an opening 5-8ths of an inch in diameter.

4733. At the same place?—At the same place between the two ventilators.

4734. Did you enlarge the former opening, or make a fresh one?—We unscrewed the nozzle, which enlarged the opening to 5-8ths of an inch; we then took the per centage of gas.

4735. You first let the gas escape?—Yes; we made this opening 5-8ths of an inch in diameter, and allowed the gas to escape freely from it for 15 minutes, and at intervals of five minutes we took the per-centage of gas near the crown of the subway; the per-centage varied from about one per cent. of gas to 2½ per cent., which was the maximum we ever obtained. At this stage of the experiments I was obliged to leave, and the remainder of these experiments were continued till midnight on Saturday, when the night pressure was on the mains, and were made under the superintendence of Mr. Bramwell and Mr. Dugald Campbell, who will be able to speak to that part of these experiments.

4736. Can you say no more about Saturday?—No.

4737. The amount of gas was 2½ per cent when you left it?—Yes.

4738. Mr. *Bagwell.*] You say you found 2½ per cent of gas in the crown of the subway?—Yes.

4739. How much gas had escaped during that time?—That I could not say, except at a very rough guess, what the quantity was, because we could not interpose a meter to measure it, otherwise it would have interfered with the free escape of the gas, which was supposed to represent an accidental escape from the aperture in the main; the pressure of gas at the time was 9-10ths of an inch.

4740. Mr. *Cripps.*] Perhaps you can answer the Honourable Member's question. After the experiment continued some time, you put your light to the aperture from which the gas was coming out, did you not, and set it alight?—Not on Saturday, during the time I was there; that was done by the other gentlemen; I heard so, but I did not see it while I was there.

4741. Mr. *Duff.*] On Saturday, do you know how the draught was; was it a down draught or an up draught?—It was a down draught apparently in some of the ventilators, and upwards in some of the others.

4742. Between the two ventilators you tried?—What we ascertained was this: that sometimes gas from the escape pipe made its way to the ventilators to the right, and at other times to the left; it sometimes took one course, and sometimes the other course; we could tell that by the smell. When it was taking the one course, if we placed ourselves between the pipe and the other ventilator through which it was not going, there was no smell of gas at all; and in that way we could perceive that the course changed several times during the course of our experiments.

4743. On Saturday, when you opened the pipe, did you happen to know which way the draught was; was it up or down between the two ventilators when you opened the pipe?—The draught was always along the subway; sometimes in one direction, and sometimes in the other.

4744. *Chairman.*] Did it go up through the hole in the street?—The gas went up into the hole.

4745. Mr. *Duff.*] I want to know between the two ventilators, whether it was an up or a down draught, because, certainly when I was in the subway it was a down draught from the ventilators?—We did not test the draught in each ventilator on that day.

4746. Mr. *Jackson.*] Whether it was an up draft from the one, or whether it was a down draught from the other, or not, the gas found its way through the openings?—It always found its way through the next ventilator.

4747. Whether it went to the left or the right, it always found its way out?—Yes.

4748. Mr. *Paull.*] You had arrived at stating that the gas had gone through the ventilators; I do not think you had got so far as that; you had reached the point of the per-centage of gas at the crown of the arch?—Yes; it was also tested near to the ventilator on each side, and the per-centage of gas found there did not vary very much from that found near the place where the opening was made in the main where the gas was flowing.

4749. I dare say it is all very easy, but I do not understand how the percentage of one article is ascertained unless you know the quantity of the other?—The per-centage was ascertained by Mr. Ansell's instrument.

Mr. *Cripps.*] I propose to call Mr. Ansell, with whose instrument it was done, if you will allow me to suggest; I was myself present there on Monday, and I know how much beyond the experiments of Saturday the experiments of Monday went, therefore we are rather hanging about what may be thought a less important matter.

Witness.] The experiments of yesterday were very much more systematically made than were the preliminary trials which were made on Saturday; the experiments which were made yesterday were made in the presence of all the parties, and would be upon the whole more satisfactory than those which were made on Saturday.

4750. When you come to the experiment of yesterday; that we all know went beyond the experiment of Saturday; will you describe to the Committee what the experiment of yesterday was?—The experiments of yesterday were the following——

4751. Mr. *Jackson.*] First of all, let us know who were there?—I am afraid I cannot tell you the names of the gentlemen present.

4752. Mr. *Cripps.*] I think I can give you the names; Mr. Ansell was there?—Yes.

4753. Dr. Letheby was there?—Yes.

4754. Dr. Odling?—Yes.

4755. Mr. Hawksley, junior?—Yes.

4756. Mr. Bramwell?—Yes.

4757. Mr. Hemans?—Yes.

4758. Myself and my learned friend, Mr. Wilkinson?—Yes.

4759. And Mr. Smith the solicitor?—Yes.

4760. And some one who represented from the solicitor's office on the other side; I am not aware of the gentleman's name?—Yes.

4761. Mr. *Paull.*] Doctor Percy was not there either of the days, was he?—Doctor Percy was not there; I saw Doctor Percy on the Saturday, and he promised to come on the Saturday afternoon to see the experiments made then; and if not on the Saturday afternoon, he would try to get down on Monday, for the experiments which were fixed for three o'clock; however, he did not arrive whilst we were making the experiments.

4762. Mr. *Cripps.*] I have given you the names of those gentlemen who were there in the afternoon; you are going now, to speak of the experiments that took place in the afternoon?—Yes.

4763. At what time was it?—From three to half-past they began; the first experiment consisted in making an aperture 3-8ths of an inch in diameter at an 18-inch gas main, and allowing the gas to flow from this aperture for 15 minutes; three sets of observers were stationed at different points of the subway, the apertures in question being made midway between the two ventilators; one set of observers was stationed near to where the escape took place, that is midway between the two ventilators, and a set of observers also stood close to the two ventilators on each side of those points, and therefore on the escape side of each ventilator, if I may be allowed the term; at the end of 13 minutes, observations were taken by all those parties simultaneously of the per centage of gas near the crown of the arch; I was one of the observers in the centre, close to the escape, and I found between 13 minutes and 15 minutes, from the time the aperture was made, 3 per cent. of coal gas near the crown of the arch; the next experiment consisted of making at the same place, an opening of an inch and a half in diameter.

4764. Let me ask you before you go from that, after having tested that there was a small quantity by the indicator; you lighted a match did not you?—Yes; after the testing by the indicator had been concluded, a match was struck across the crown of the subway, where the gas in the largest quantity was, and it burnt with a slightly larger flame than usual there, owing to the presence of this percentage of coal gas; we then brought the match gradually down to the jet of gas as it was issuing from the main, and ignited it, and it burnt just as it would burn in this room.

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4765. It was then coming out very freely was not it, the flame went up into the subway?—It rushed against the roof of the subway; there was a very strong rush of gas from this aperture.

4766. Will you go on to what was the next done?—Then we opened an aperture near the same place, of an inch and a half in diameter, and allowed the gas in the same way to flow out from those apertures for 15 minutes, and testings were made in the same manner as before, and the highest per-centage of gas tested and ascertained midway between the two ventilators on this occasion was only 1 decimal 9 per cent.; therefore less than in the former experiment. That was no doubt owing to the draught setting in in another direction unfavourable to the gas coming in contact with the ventilators.

4767. Mr. *Duff.*] Was that the same time?—It was between 13 and 15 minutes.

4768. Mr. *Cripps.*] You are giving what you found yourself in the centre at that time?—Yes.

4769. But you know what was found at the other ends too, do not you?—I have not notes of what was found there, but the gentlemen who made those observations are here, and will tell us.

4770. Did you again set it alight?—At the end of this time we again applied matches, and ignited this immense jet of gas rushing from that one and a half inch aperture, and it burnt quietly, just as it would burn in the open air.

4771. When you say that it burnt quietly, the jet of gas that was coming out then was sufficient to throw the flame right over the subway, was not it?—Not right over the subway, it was from four to five feet long, and a great body of flame, but it did not reach over the subway.

4772. There was a great pressure, and it was coming out rapidly?—Yes. The next experiment consisted in opening two such apertures, each 1½ inches in diameter, on opposite sides of the subway, from the two mains which supply the whole of the street lamps in Southwark-street. These were allowed to remain open for 16 minutes, and from 13 up to 16 minutes, testings were made. I think the highest per-centage that I found there, in the centre between the two ventilators, was 3 per cent. of gas, the lowest explosive mixture being six decimal 6 per cent. of gas. We then lighted matches as before, and we ignited first one of those jets in order to ascertain whether it would communicate its fire to the jet on the opposite side, as the two streams of gas were meeting at the crown of the arch, and it did not. I may say that that experiment had been repeated frequently before the experiments of yesterday, and we never could succeed in making the jet on one side ignite the corresponding jet on the other side.

4773. Viscount *Galway.*] Was there a strong smell of gas before you ignited it?—A very strong smell.

4774. Mr. *Cripps.*] There was a very strong smell when you put the match to it?—Yes; a very strong smell; in fact, when we had our heads in the upper part of the subway it was rather unpleasant from the per centage of gas.

4775. It is the result, is it not, of your tests that the amount of gas was not increased up to the last, that after you had gone on one quarter of an hour after the other, the amount of gas per-centage was the same as it was after the first quarter of an hour?—Yes; the per-centage was exactly the same at the end of the experiment as it was at the end of the first experiment. I may mention that, in the observations made in the preceding experiments, it appeared to me that the per-centage of gas was rather larger at the beginning of the experiments than towards the end, that the draught established itself, as it were, up those ventilators, and carried the gas more rapidly off after that was established than it did before.

4776. Mr. *Jackson.*] Then your opinion is, that the gas which accumulated there found an immediate vent through the apertures?—It must have done; it must have rushed with great rapidity out of the apertures.

4777. Supposing that the subway was full of gas at the end of 10 minutes, would there be a greater quantity at the end of 16 minutes than there was at the end of 10?—Supposing the subway to be full of gas at the commencement, would it be freer in 10 minutes, do you mean?

4778. No; supposing the pipe flowed 10 minutes, and you then tested it, there must have been an additional quantity of gas flowing from the opening in the

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the next five minutes, which the ventilators had carried off; that extra quantity which came out between the 10 and 15 minutes?—We always found it to be so; there was no greater amount of gas at the end of the 10 or 15 minutes than at the end of the first five minutes.

4779. Do you think that the gas itself caused a current to pass through?—I have no doubt the effect was produced in that way; the moment that the gas established a way for itself up those apertures, it continued to flow very rapidly through them, and it did not matter how long we continued the experiment; I do not think we should have got a larger per-centage than we found in the first place.

4780. Viscount *Galway.*] Was the subway in the same state as when the Committee went into it?—I think so.

4781. Mr. *Cripps.*] I think, if I remember, in that case the door was kept shut the whole time?—The door was kept shut and locked the whole time.

4782. Viscount *Galway.*] The door was open when we were there?—That would alter the condition of matters.

4783. It would be rather against you than for you when the door was shut?—Yes.

4784. Mr. *Paull.*] You were in the centre all the time, I believe?—In the centre between the two ventilators.

4785. Of your own knowledge, you do not know that any gas went up either of the ventilators; it is a question of inference with you; of your own knowledge you do not know?—Yes, I do, because I went up into the street; I had not to kneel down, for standing up over them I could smell the gas.

4786. Viscount *Galway.*] There was a strong smell of gas in the street as well as in the subway?—Yes.

4787. Mr. *Cripps.*] In the last experiment you opened a pipe, so as to get the fullest flow of gas into the subway of which the pipe itself would admit?—We did; we admitted all the gas that we could get into the subway.

4788. All that the gas pipe would give you; in fact the pipe was severed?—Yes; both pipes.

4789. It represented a fracture on both sides; an entire fracture?—It did.

4790. Was that a pipe which had been supplying the street lamps in the street?—I believe so.

4791. You say that you left on Saturday; did you leave Mr. Dugald Campbell there?—I did; and Mr. Bramwell.

4792. Do you know that they experimented further while you were away?—I heard so.

4793. Can you tell the Committee who the two other experimenters were who tested the gas; I mean at the two ventilators, while you tested it at the centre?—Mr. Ansell had the conduct of the instrument at one of the ventilators.

4794. Who was with Mr. Ansell on Saturday; was not Dr. Odling with him?—No; Dr. Odling was with me. Dr. Letheby was with Mr. Dugald Campbell. I do not remember who was with Mr. Ansell.

4795. I meant to say on Monday?—On Monday.

4796. Was that the experiment which you have just been telling the Committee about; when you were experimenting, you say Dr. Odling was with you?—He was.

4797. And at one of the ventilators there was Dr. Letheby and Mr. Dugald Campbell?—Yes.

4798. Who were at the other ventilators?—Mr. Ansell was there, and I think Mr. Upward; but I am not sure.

4799. Mr. Hawksley, jun.; was he there; you know Mr. Hawksley's son, do not you?—Yes.

4800. Do not you know that he was on the other side?—I know that he was present at the experiments; I am not certain that he was with Mr. Ansell there.

4801. I need scarcely ask you the general question, whether your confidence in putting gas in subways was not very much confirmed by the result of these experiments?—It was. I think I stated before, in my evidence, that the result of such an accident as that which we intentionally caused would be what it turned out to be.

4802. Possibly you might have gone down in some fear at first, as I did myself?—

self?—One never likes to run any risk in that way, but there certainly was no risk there.

4803. Those experiments were much more than what was suggested should be made by Dr. Percy?—They were very much more; Dr. Percy suggested a quarter of an inch aperture, and to go to a 1½-inch aperture.

Cross-examined by Mr. *Denison.*

4804. I am not quite sure whether I caught your answer right, but was it this, that the per-centage of gas in all the ventilators was much the same as near the pipe?—That was in the experiment on Saturday; but I mentioned that in the experiment of yesterday I have not received the results of the other gentlemen.

4805. It was with reference to Saturday I took that down; that was right, was it?—Not near both ventilators at the same time, because we found the gas usually preferred to go to one of them.

4806. Are you speaking of the one up which it was going?—Yes.

4807. The per-centage of the one up which it was going was the same as it was at the pipe where the hole was made?—It was, upon several occasions; one or two occasions, at all events.

4808. The pipe was quite at the bottom of the subway; was not it?—It was about three feet from the ground, but the aperture from which the gas was escaping on Saturday, the same aperture was more on the ground; the gas was rushing out horizontally.

4809. You say that you cannot tell me what the per-centage was at the opening on Monday?—I know the per-centage; near the opening you mean.

4810. Can you compare the two; the per-centage near the opening in the main, with the per centage near the ventilator on Monday?—No; I do not know it.

4811. On Saturday, however, you can, and that is the result?—On several occasions.

4812. Is it a fair inference from that that the air was pretty much in the same condition with regard to the diffusion of gas at the top as near the bottom of the subway?—There was no gas at all near the bottom of the subway.

4813. At any rate at the pipes?—No; the general result of my experiments was this, that at a distance of about 2 feet from the top of the subway, unless this escape had been going on for a very long time, you could not smell gas at all.

4814. Of course we want to know what it was when it had been going on a long time; when it had been going on a long time, was there any material difference in the impregnation with gas near the ventilator and low down in the subway?—A great deal.

4815. What was the difference?—We could detect no gas whatever near the floor of the subway.

4816. Below the pipe, or above it?—Below the pipe, and even above it, the odour was faint.

4817. How is that reconciled with what you began by telling me that the per-centage near the ventilator was much the same as near the pipe?—The ventilator is near the top.

4818. I know that the pipe is near the ground?—Yes.

4819. The pipe was three feet from the ground?—The pipe was three feet from the ground, but 40 feet from the ventilator.

4820. The pipe was three feet from the ground?—Yes.

4821. What was the per-centage of gas in the air near the pipe?—Near the aperture?

4822. Near the aperture?—That we did not take near the aperture; we took it above that.

4823. I must again ask what was the meaning of your answer in saying that the per centage near the ventilator was much the same as near the pipe?—I think we do not understand each other at all; I do not know how I am to make it clear.

4824. You mean "near" in another sense, I suppose (*the Witness made a diagram*)?—I suppose this to be subway; here are two ventilators passing into the

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the street, and in the centre between them, and at an elevation of three feet from the floor there was a pipe delivering gas.

4825. The per-centage of gas was 3 per cent. here; we will suppose that that is how the pipe was going?—It never got so high as 3 per cent. on Saturday.

Chairman.] It was only 2½ near the ventilator.

4826. Mr. *Denison.*] This was the part where it was 2½ at the ventilator?—Yes.

4827. Mr. *Paull.*] This gentleman cannot tell you what it was near the ventilator, because he was always near the centre?—On Saturday I got the results from the gentlemen only verbally; I am only speaking from memory as to those results.

4828. Mr. *Denison.*] Assuming for a moment that it was so, that it was 2½ per cent. there, do you know what it was there at the pipe?—It would be all gas just over the pipe.

4829. Then at some intermediate place between there and there (*pointing to the diagram*), what was it?—Never more than 2½ per cent. at any place between there.

4830. How did you know that; did you test it at all the intermediate places?—Not at all the intermediate places, but at certain intermediate places where it was tested no higher per-centage than that was found; the gas rushed directly up to the roof of the subway, and then it obviously spread out rapidly, and then it went up that ventilator or that one, it went sometimes in this direction and sometimes in that direction, but it did not seem to go in both ways.

4831. Was it tested say at a height of three feet, for instance, from the crown of the arch?—Yes; the way I did it was this, I ascertained by the smell of the gas on each side of the pipe in which direction the gas was going, and then I tested it in the intermediate part of the subway, between the pipe and that ventilator through which the gas was driving at the time, so as to get the largest per-centage of gas.

4832. On the question of diffusion, can you tell how much of the gas was diffused anywhere in the subway?—It was very little diffused.

4833. But you cannot tell me in the way of per-centage?—No; but I know that in sitting down in the subway you could perceive the odour.

4834. Was the hole in the top of the pipe?—Yes; it was, in fact, a stand pipe, which was screwed into the main.

4835. *Chairman.*] I understand this: the experiment on Saturday, so far as you were concerned, was made from a service pipe some height from the ground; the experiment of yesterday was made by unscrewing the service and making a large hole in the pipe itself; is that so?—The first experiment of yesterday was made by tapping a hole in an 18-inch main, which was supplied from the service with gas.

4836. On the ground was that?—About 6 inches from the ground.

4837. Mr. *Denison.*] Was that hole in the 18-inch main, at the top of the pipe?—Yes.

4838. So that in one case it was on the top of the service pipe, three feet from the ground, and in the other case, it was at the top of the main pipe, lying practically on the ground?—It would be about 18 inches from the ground, and then in the other experiment it was on the ground, and in the two last cases it was on the ground, the gas flowing horizontally.

4839. In any of those cases, was one of those holes left open longer than a quarter of an hour, without being lighted?—Yes; on one occasion it was as I said 16 minutes, that was a little longer; I believe some of the other experimenters had them open still longer.

4840. As far as your experiments have gone, it was not left open unlighted more than 15 minutes?—Not on any one occasion; but those 15 minutes followed each other very quickly.

4841. So that after being open a quarter of an hour, it was lighted?—Yes.

4842. Then of course the place got warm by being lighted, to a certain extent?—Yes; it was not very long lighted.

4843. And then that light was put out?—Yes.

4844. And the hole widened?—Yes; or a new hole was made.

4845. How do you account for this, which struck us here as odd at the time that there seems to have been no more gas coming out, whether there was a large hole or whether there was a small one?—I do not think that resulted in the least from the experiments; it is very difficult to get the exact mean composition of gas in any particular part of the subway, because as I have just explained, it sometimes travels in one direction, and sometimes travels in another direction; and if we should happen to be testing the gas at the moment this current was reversed, we should get a lower per-centage than we should expect, and the gentlemen who were testing it near the two ventilators, would detect that by finding a larger per-centage there.

4846. As far as you know, there is no such larger per centage there?—I know nothing about that out of the ventilators.

4847. I suppose when the subway got warm, the draught upwards would naturally be increased, would not it?—It might a little; but really the warming was very immaterial from that; we did not burn the gas long.

4848. You described rather a long and large flame?—It was a large flame; it was a very good length while burning.

4849. What was the length of the flame?—From four to five feet.

4850. Was that from the three-eighths hole or the five-eighths?—No; that was from the inch and a quarter.

4851. There was a previous one before we got to the inch and a half; I have got it down here; there was a flame, a large one?—Yes; that burnt against the roof of the subway; it could not give its full length of flame.

4852. That was from the three-eighths hole?—Yes.

4853. At the top of the three feet pipe?—At the top of the 18-inch diameter pipe.

4854. The 18-inch pipe was near the bottom of the subway?—It was supported about six inches from the bottom of the subway.

4855. How far is that from the top of the subway?—It is at the side of the subway; at the arch it would be, I should say, about two feet from the top of the subway; the flame went immediately against the subway, about two feet from the top of the subway.

4856. You cannot tell what the length of the flame would have been if it had been free?—No.

4857. Dr. Percy said that to do these things fairly, there ought to be holes made in the side passages; were any holes made in the side passages?—He did not intimate anything of the kind to me.

4858. Dr. Percy is asked at question 4713, "Do you think it would make any difference whether a hole was made in the middle of the subway, or in one of the side passages?" He says, "Probably it would be desirable to make a hole in both." The next question is, "They would be affected rather differently, would they not?" He says, "Very likely they might be." But, however, you had no instructions about making a hole?—He gave me no instructions about that. I requested him particularly to describe to me every experiment he would like to be made.

4859. You possibly do not know anything about the question of notice. All you tell us about is your experiments being made for preparation on Saturday. Do you know anything at all as to whether notice was given to us to attend?—I know nothing about that.

4860. We did not attend, any of us, it seems till about half-past three on Monday?—No.

4861. Here is the notice. I may as well read it now. It is signed by Mr. Smith: "Metropolis Subways Bill,—Owing to the difficulty of getting at Dr. Percy, owing to his many engagements, and meeting with Mr. Ansell, I have only this moment ascertained that the experiments required by Dr. Percy will be made at three p.m. to-day, in the subway in Southwark Street. We shall be happy, of course, to see you, and any gentlemen you may desire to be present." That is dated yesterday, July the 8th; do you know anything about the state of the apertures at the sides, whether they were closed or open?—They were, I should say, all of them that I have seen, practically closed; you can just see daylight through some of them through a little break, or something of that sort.

4862. What is the size of these holes, through which you could see daylight?—Certainly not more than five or six inches square.

4863. The reason why you can see daylight is, that one of them does not quite overlap another, so that by looking obliquely, you can see daylight through; is

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is that the case?—No; you can see daylight by looking out of the principal subway through one of those side passages, because there is a space of waste ground there, and there is a wall at the end of the passage, and the wall is slightly imperfect.

Re-examined by Mr. *Cripps.*

4864. But the side passage that goes into there has a door to it?—Yes.

4865. That door was closed carefully, and somebody stationed there to prevent its being opened all the time?—I believe there was somebody stationed there.

4866. About the bottom of the subway; at this time you put the indicator between the experiments, at the very bottom?—Yes.

4867. There was no gas at all there, was there?—No.

4868. There was a sensible difference whether you stood up in the subway or whether you sat down?—Yes; it did not require any indicator for that purpose.

4869. That was all along between the intervals, while the experiment was going on?—Yes.

4870. You were asked about the gas being lit at the jet, it was only lit just long enough to show that the rush was coming out, and it was put out again directly, was not it?—Yes.

4871. It was put out without turning any cock?—Yes; it was put out by putting a lump of clay on the large openings, and I think a cloth was used in putting out the smaller ones.

4872. It was only lighted just to show that the gas was escaping out, and there was an end of it?—Yes.

4873. Mr. *Paull.*] I suppose, the larger the hole the greater would be the pressure of the gas, and increase of the ascension power?—The greater the pressure of the gas in the main.

4874. The larger the hole in the main, the greater would be the pressure of the gas, and hence the more ascensive power?—Towards the roof of the subway?

4875. Yes?—Yes.

4876. If there were a rush of gas it would go more quickly through the air to the roof or to the ventilators than it would if there was a smaller leakage?—I think so; no doubt a large body of gas would mix less in its passage upwards to the roof of the subway, and therefore it would go through the hole sooner.

4877. So that the smaller the escape the more lively would be the diffusion of the gas through the air?—Undoubtedly.

4878. Therefore the better experiment, the stronger experiment that you tried would be with the smaller hole?—Well, I scarcely think so; because the smaller hole shot right upwards to the crown of the subway, whilst the two large holes in the last experiment delivered the gas horizontally along the floor of the subway.

4879. Mr. *Cripps.*] The smaller hole that you have described was made in the upper part of the main?—Yes.

4880. But the 1½-inch hole was made by parting two pipes as they are here, so, was not that it?—Yes.

4881. Therefore the gas came out not above, but laterally, did not it?—Yes; the pipe was laid along the floor of the subway; it was broken off, so to speak, there, to allow the gas to flow horizontally along the floor of the subway.

4882. Mr. *Paull.*] But whatever the hole was the greater the rush of gas the quicker would be its rise?—I think not if the rush of gas were downwards; for instance, it certainly would rise more slowly the greater the rush, because it would make its way further downwards if there was a space for it, rushing out horizontally; and, I think, also the greater the rush of gas, the greater would be the tendency to diffuse before it got up to the roof, because naturally by rushing out at a strong pressure it would reach a greater distance through the air before it began to ascend much, and would have more opportunity of mixing with the air; but where the rush was directly upwards, then, I think, the larger the aperture, and the greater the pressure at which the gas was delivered, the more unmixed would it reach the roof.

4883. Did you try this aperture near one of the side passages?—One of them was very near a side passage, but not in the side passage in any sense; it could not affect the side passage in any sense.

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4884. Supposing that to have taken place, and the rush of gas, whether strong or slight, had been into one of these side passages, would it have remained there, in your judgment, or would it have found its way back again, and so up to the centre of the main arch?—It would certainly have found its way back again, along the roof of this side passage into the main arch.

4885. So that you do not think "pockets" of gas, as they have been called, would be formed in those side arches?—I do not think so, because the crowns of those side arches are much lower than the crown of the main arch; and inasmuch as the gas takes every opportunity of flowing upwards, it would certainly clear itself out from the side passages in a very short time; they are very short passages; if they were very long passages it might be a different matter, but they are short passages.

4886. Do you attribute the smaller per centage of gas that you found at the crown of the arch to the complete escape of it into the open air, rather than to the general diffusion of it through the air in the subway?—I think so; my opinion is strongly in favour of that view of the transit of the gas.

4887. But you did not yourself test the flow of the gas into the crown of the arch immediately at the aperture of the ventilators?—I did not; that duty was confided to the two other experimenters.

4888. Viscount *Galway.*] What quantity of gas would be emitted from the 2½-inch holes which were opened in the experiments you made with the two pipes on the opposite sides; do you happen to know what was the amount?—I am afraid I cannot give you any statement of that.

4889. *Chairman.*] Is there anybody who can?—There were several gas engineers there.

4890. Mr. *Cripps.*] I suppose it would be a matter of calculation, judging by the hole and the pressure?—Yes.

4891. Viscount *Galway.*] According to the evidence you have given, it appears to me that you think it would be scarcely possible that there should be such a very terrific explosion in a subway, supposing that it was ventilated even as you saw the other day?—I cannot conceive such an explosion taking place, unless through some tremendous accident or convulsion of some kind; for instance, an earthquake, or a break of the main; of course such a thing would be possible, but in any operations that I know which are likely to be carried on in the subways, I cannot conceive the workmen being so careless as to allow even such a quantity of gas to escape as the quantity we operated upon yesterday.

4892. Mr. *Jackson.*] You say that the main of 18 inches sent forth its gas horizontally?—The 1½-inch main, I think it was; the two 1½-inch mains.

4893. But the 18-inch main was placed, you said, about 18 inches from the ground?—The lower part of the main was six inches from the ground, then there would be the 18 inches of the main itself; the aperture was made upon the top of the main, so that you may say about two feet from the floor the gas came out.

4894. Did you try where the gas was emitted from near the floor, whether the gas descended and mixed with the atmospheric air?—We did try that, and we always found that part of the subway entirely free from gas.

4895. It did not descend lower than the spot from which it was emitted from the pipes?—It did not.

4896. Mr. *Bagwell.*] You stated that on Saturday 2½ per cent. was the highest amount of gas you got?—Yes; 2½ per cent.

4897. And on Monday, what was the highest?—Three per cent.

4898. In your opinion, what effect had the particular state of the atmosphere upon those days upon your experiments?—I do not think it had any particular effect, so far as the days were concerned; both of them were hot days, and they would be perhaps against the ventilation in the subway; the heat of the weather would be against the ventilation in the subway, because the heat in the street was very much warmer than the air in the subway.

4899. Supposing a heavy fall of snow on the streets, such as we have sometimes in London, what effect would that have upon the ventilation of the subway?—If the ventilators were stopped up with the snow, the ventilation would be stopped.

4900. How could you obviate their being stopped up, supposing there was a fall of snow?—I believe the current of warm air, which under such circum-

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stances would be sure to arise from those ventilators, would, excepting in very severe weather indeed, melt the snow falling upon those ventilators; I have observed, with respect to the iron doors through which the workmen gain access to the sewers, that they never allow snow to accumulate upon them, the warmth from the sewer below keeps the snow melted upon those iron doors in the streets in London, and I feel sure that the same effect would take place with these ventilators, and to a greater extent, inasmuch as there would be actually a current of air coming through them; there is no current of air coming through those iron doors to the sewers.

4901. You think that would be the effect, no matter how heavy the fall of snow was?—I would not say that it would be impossible that those ventilators should become closed, but they might; to be kept clear, it should be the duty of somebody to see that they were not closed.

4902. You got three per cent. of gas on Monday; what increase of gas would have been necessary to make that an explosive mixture?—Six decimal six per-cent., that is the very lowest proportion which it is possible to explode; it is rather a lower per-centage than is usually stated to be the lowest explosive per centage of gas in the air, but I have, on one or two occasions, got explosions under very favourable circumstances, with six decimal six per cent.

4903. *Chairman.*] Was that carburetted hydrogen or common hydrogen?—Common coal gas; but I may state that those explosions were got by igniting phosphorus in the gas, by a voltaic current; they could not be got by matches.

4904. Mr. *Bagwell.*] When you had the small leakage in the pipe, not the great rush of gas which, as you said before, one can very easily conceive would be of itself so powerful, that it would clear a way for itself to the outer air; but supposing that small leakage, instead of a quarter of an hour, had been going on all through the night, what do you think would have been the effect of that?—I do not think that the per-centage would have increased, and for this reason, on Saturday, in making similar experiments, we took the per-centage every five minutes, and we almost invariably found the highest per-centage at the end of the first five minutes, and it became lower afterwards; the escape going on all the time.

4905. Supposing by some accidental circumstance that the two ventilators, say nearest to your experiments, had been closed, supposing that something had broken down in the street, or any accident that might very easily happen, supposing those two ventilators had been closed; what do you think would have been the effect then; would the gas have escaped equally quickly out of the distant ventilators?—I think not equally quickly.

4906. What per centage of gas might you have accumulated under the circumstances which I have mentioned; with these 80 feet apart ventilators the gas would have to go 80 feet further this way or 80 feet further that way, to escape; what proportion of gas might have been accumulated between those?—It is very difficult to form an opinion without an experiment, but I should not think it would make a difference of more than about one per cent. of gas in the air; still I give this opinion with very considerable diffidence, because it is a matter which ought to be experimented upon to be able to answer the question with certainty.

4907. Mr. *Duff.*] Has the result of these experiments led you to the conclusion that the subway is sufficiently ventilated?—I think that the subway, as it is now ventilated, is sufficiently ventilated.

4908. Viscount *Galway.*] That is the Southwark-street subway?—Yes; the Southwark-street subway.

4909. Did you go into the Garrick-street subway at all?—I have never been into the Garrick-street subway.

4910. Mr. *Duff.*] It was suggested by one of the witnesses that the subway would be better ventilated if those ventilators were closed, and there was a current of air established through the subways; that is not your opinion?—No; I dissent from that opinion.

4911. I think you said that the side passages are not all ventilated?—They are certainly not all of them ventilated, you can scarcely say that any one of them is really ventilated; there is a small opening at the far end.

4912. Supposing there were a ventilator at the summit of each of the side passages, would gas escape quicker there then than it does now, with only the ventilators at the crown of the main arch?—Yes; because very likely there would be then a downward current through the side passage into the subway passage, which would tend to drive out the gas into the centre of the subway.

4913. Do you think it would be an improvement if there were those additional ventilators; would it make it more safe?—I think that might be an improvement.

4914. That would take away any fear of danger?—Any fear of danger in the side passages; I do not think it would materially improve the centre; in fact I do not well conceive how it could be much better than it is now, but it would improve the side passages, no doubt, by keeping a current through them.

4915. Mr. *Floyer.*] Do you think the stationary character of the per centage of gas was due to the gas passing off through the ventilators, or to the wider diffusion of the gas in the subway?—I think it might have been due to its passing off rapidly through the ventilators, because I ascertained that it was so passing off by standing over them in the street.

4916. Was there not a fresh breeze blowing in Southwark-street at the time you performed those experiments?—I think on the Saturday there was a tolerable breeze, but not a very fresh breeze; but yesterday, if I remember rightly, there was no breeze; I do not remember being struck by the breeze at all yesterday, but I did not observe that point specially.

4917. I think you said that you did not take any special notice actually of the ventilation before you commenced your experiments?—Not upon this occasion, but I did on previous occasions; when I was making those experiments upon the spontaneous leakage from the mains I tested several of those ventilators, and in every case I found the current going upwards from them, but those were smaller ventilators than they are now in the subway; new ventilators were put in a short time ago; those I tested formerly were smaller ones.

4918. In that case the supply of air must have come from some other source than the ventilators themselves?—I did not test all the ventilators.

4919. Perhaps the door might have been open?—I think it very possible; I did not test all the ventilators, but all that were tested exhibited an upward current; on that occasion no attention was paid to the door, it may have been open.

4920. Mr. *Grove.*] Do you think if the door were left open it would cause a downward draught from the ventilators?—On the contrary; I think it would strengthen the upward current, because it would admit air to the lower part of the subway.

4921. And that would occasion an upward draught?—An upward draught through the ventilators, and especially in winter.

4922. Mr. *Jackson.*] You have stated that in very hot weather the atmosphere in the subway might be colder than the atmosphere on the outside?—Yes; in warm weather, it is at the present moment.

4923. Do not you think that the temperature might be kept right, in order to move the gas upwards by means of jet lights from the gas pipes; would not that be sufficient?—If necessary that could be done, no doubt; there would be no difficulty about it, but I do not think it is necessary.

4924. You are a man of great reputation, the world knows you, and you have no hesitation in giving your opinion that there is no danger in putting gas mains in these subways as they now exist?—I think not; with fair precaution being observed in the laying of those lines, I do not see any danger in putting them as those subways.

4925. The experiment was fairly made in your opinion?—Quite so; it was made under the most disadvantageous circumstances that I can conceive, I mean disadvantageous for the escape of gas.

4926. Viscount *Galway.*] There was no objection made by the other parties while you were making the experiments?—There was none that I remember.

4927. Mr. *Paull.*] Dr. Percy, who has not favoured us with his presence today, although this experiment was allowed to be made, in order that he might give us the results, had this question put to him, "No experiments which we could make would meet all the possible causes of leakage which might arise in subways." Dr. Percy says, "I think it would meet a great many of them, of course, I could not say that it would meet all possible cases; the great source of danger appears to me to be from the leakage." In your judgment, all the sources

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sources of danger are reduced to a complete minimum?—I think so. I imagine that the mains laid in a subway would be much less liable to accidental leakage than mains laid as at present in the streets.

4928. My question points to this; that however they may be laid, supposing there to be a leakage and an escape of gas, no danger would result from it?—Not unless the escape were very excessive. I do not mean to say that no possible escape of gas into the subway could, by any possibility, occasion an explosion; but I say with the great escape which we allowed yesterday, there was no risk whatever of an explosion; it was not possible to produce an explosion.

4929. Supposing that a quarter of an hour was extended to 12 hours, would that great accumulation be likely to take place which you say would involve danger?—I should have no hesitation in lighting that gas again if it had been going for 24 hours.

4930. Lighting it where?—Lighting the two jets coming out of the two mains of an inch and a half in diameter.

4931. That would be the place where the least danger would result, would not it?—I think not.

4932. Because if the gas immediately issuing from the pipes were lighted, it burn like any other burner?—Yes; but I would communicate its combustion to any explosive mixture there might be in its neighbourhood; however, I may state that I would have still less hesitation in applying a light to any other part of the subway than to this part near the two escape pipes.

4933. Not excepting one of the side passages?—No; I should have no hesitation whatever in applying it to the side passages.

4934. *Chairman.*] You mean if the escape of gas from these openings had been allowed to go on for 12 hours?—I think so.

4935. Viscount *Galway.*] Would there be any difficulty in discovering these leakages or any danger in going in?—No; and you may even have an indicator at any neighbouring police station of any accident or escape of gas, with the greatest facility, by means of this instrument invented by Mr. Ansell.

[The Witness withdrew.

Dugald Campbell, Esq., called; Examined by Mr. *Cripps.*

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4936. I WILL take you first of all, as carrying on Dr. Frankland's evidence, to yesterday in point of fact, with reference to the experiments that took place yesterday; you were testing gas at one of the ventilators, at the same time that Dr. Frankland was testing it at the point of escape, were you not?—I was.

4937. Dr. Letheby on behalf of the companies, was there with you at the time?—He was.

4938. And you had one of Mr. Ansell's indicators to test the gas with, at the time?—It is so.

4939. After the first opening had been made, and at the end of the 15 minutes, did you test that gas at the ventilator, but on the side of the ventilator, towards where the opening in the pipe had been made?—Yes.

4940. What was the result there; what amount of gas did you find at the top of the arch?—When the small opening was made in the upper part of the 18-inch pipe, we found 2·27 per cent. of gas.

4941. That was at the end of the 15 minutes?—At the end of the 15 minutes.

4942. Then you saw a match applied after that to the roof, I believe?—I did.

4943. When the second experiment was performed, the opening of the larger aperture, you were in the same place with Dr. Letheby again, were you not?—I was.

4944. After the 15 minutes had elapsed, did you then test the gas again, in the same place?—I did.

4945. What did you find then?—The per-centage was 1·6 per cent., rather above 1½.

4946. After that a third experiment took place, that of severing the gas pipes on both sides, so as to cause the greatest flow of gas you could into the subway?—Yes.

4947. After that had been going on for 15 minutes, did you again test it at the same place?—I did.

4948. What did it give then?—1·81 per cent.; under two per cent.

4949. M. *Paull.*] Was this absolutely at the ventilator?—Within a foot and a half of the ventilator; as it was flowing past, you could feel the current.

4950. Mr. *Cripps.*] The opening was made as nearly as could be between two ventilators, so as to be as far from the ventilators as possible?—As nearly as could be.

4951. Your experiment was made about here; that was the ventilator, and this was the aperture, and your experiment was tried here (*describing the same*)?—Within about a foot and a half of the ventilator in the archway; in fact I held it as Dr. Letheby suggested me to do.

4952. Dr. Letheby suggested to you where to hold it?—Yes; in fact to hold it with a certain slanting.

4953. Now then, to go from these experiments to the experiments you made on Saturday; you were there, and made experiments of the same nature on Saturday?—Yes; conducting them much longer.

4954. About how long altogether were your experiments on Saturday?—The experiments on Saturday lasted for at least six or eight hours.

4955. Do you mean that during that time the apertures were made, and the gas escaping all the time?—At different apertures.

4956. But during that number of hours altogether?—During those hours.

4957. Mr. *Clerk.*] A continuous escape of gas for eight hours?—Yes; with the exception of the interruption of a few minutes between each experiment; but our experiments generally lasted for an hour each, instead of a quarter of an hour.

4958. Let us confine it to the case of an hour or an hour and a half; did you during that time keep on testing the gas to see the difference that it made in the mixture after it had been coming out of the pipe for different lengths of time?—Yes; generally every five minutes.

4959. You made those experiments every five minutes during, at least, an hour?—During, at least, an hour.

4960. Did you find during that time that the mixture of gas was greater at the end of that time than it had been during the time you were making the experiments?—No; I did not.

4961. It would follow, would it not, that the gas must have been escaping during the whole time as fast as it was coming out?—Unquestionably.

4962. I mean escaping from the subway?—Yes.

4963. Going out of the subway as fast as it came in from the hole in the main?—At some ventilator.

4964. Did you carry that on with the night pressure?—We did; our last experiment was made between 11 and 12 o'clock at night, verging on to 12.

4965. What per-centage of gas did you get at that time with the night pressure?—The highest per-centage of gas that we got with the night pressure from an aperture of an inch and a half was not more than 3 per cent.

4966. Was that, then, made in the same way as the experiment on Saturday by severing the pipe?—No, it was not; there was an opening of an inch and a half in another pipe; you may say that it was very nearly the same under the same circumstances; it was nearly an inch and a half pipe, leading out of the larger pipe.

4967. Did you experience what Dr. Frankland has described during the time you were there, that the air was much more sensibly charged with gas as you put your head up close to the crown of the arch than it was down below?—Yes.

4968. Gradually going off to nothing?—Gradually going off to nothing.

4969. You had the indicator, part of the time, I think, down upon the ground?—I kept my indicator upon the ground, and as we made the experiments we rose it up from the ground; the indicator upon the ground showed *nil*, and it was only when you brought it up to the crown of the arch that you got the greatest effect.

4970. When the greatest escape was going out, still on the ground there was *nil?—Nil.*

4971-2. Did you also go out into the street to smell the gas at the ventilator as it came up?—I did.

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4973. Did you find it coming up there?—Yes.

4974. I will ask you the general question, after having tried the matter by these experiments; are you more confirmed than ever in the evidence you gave before, that gas in subways may be perfectly harmless?—Certainly; unless some accident should happen which is beyond our imagination, something beyond the ordinary, I do not see any difficulty whatever in the matter.

4975. With the ventilation as it is at present?—With the ventilation as it is at present.

Cross-examined by Mr. *Denison.*

4976. I will just ask you what kind of accident you are referring to?—Suppose an earthquake, or something of that sort.

4977. That is the only thing that can make it dangerous, is it?—Oh, no.

4978. But something little short of an earthquake?—Supposing the subway was to be broken down, and the pipe to be broken off, and somebody was to drop a light in, there would be an explosion, or at any rate I do not know that there would be an explosion, but you would have the gas catch light.

4979. You do not believe in explosions at all?—Not under ordinary circumstances.

4980. How can you account for their happening so often in Paris?—In the first place, I am not aware that they do happen often in Paris; and in the next place, what I have heard have happened, have not been true explosions. I allude to one; I have only heard of it since I came into the room on a former occasion, wherein there was a gas pipe blown to pieces. Now it is not an escape of gas into the subway that would do that; you must have an explosive mixture in the inside of the gas pipe itself to have done that.

4981. Then two men being killed, and two others hurt, is only a false explosion?—I do not know how you may look at it; it is not an explosion of the kind we are referring to.

4982. By what sort of pipe is this 18-inch pipe fed?—By an inch and a half clear.

4983. My learned friend thinks it important that I should ask you whether you lit the gas on Saturday?—We did, and the length of the flame was about between five and six feet, and it warmed us up in a very short period.

4984. Did it warm you up; Dr. Frankland was not so sensitive to it as you?—He was not there then.

4985. It warmed you up at night?—Yes; we were glad to escape.

4986. You say you were glad to escape; how long was the flame on?—I suppose it burnt for about five or six minutes.

4987. When you say it warmed you up, do you mean that you got very hot?—Decidedly.

4988. How often did that take place?—Only once.

4989. At what time was it?—About 12 o'clock at night.

4990. That was the last?—Yes.

4991. I suppose at 12 o'clock at night all the gas lamps in the streets, supplied from this pipe, were alight?—They were.

Re-examined by Mr. *Cripps.*

4992. Then you did not warm up, did you, until after the experiment was concluded?—That was it.

4993. Therefore the warmth so created would have nothing to do with the experiment itself?—Nothing whatever. We wished to see the length of flame that the gas would make, and we lit it on that account. It was measured by Mr. Ansell in our presence, and it indicated between five and six feet of flame.

4994. That was the conclusion of your experiment?—That was the wind-up of our experiment.

[The Witness withdrew.

George Frederick Ansell, Esq., called in; and Examined by Mr. *Wilkinson.*

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4995. I BELIEVE you are a Chemist, and engaged in the Royal Mint?—Yes.

4996. And you have given great attention to the subject of gases in mines, particularly with reference to explosions?—I have; very great.

4997. I believe the result of your investigations led you to invent the two instruments which have been already brought under the notice of the Committee?—Three instruments.

4998. Will you describe them; first of all tell us shortly what they are called?—They are called Ansell's Fire-damp Indicators.

4999. Those instruments are in use in England, France and Belgium?—They are.

5000. And have been very generally approved?—I have not had a single complaint yet; there is no instance of complaint of failure.

5001. I will not invite you to go into a detailed description of those instruments, but one of those instruments registers the per centage of gas present in the atmosphere?—It does.

5002. Will you show it?—This is the instrument (*producing the same*).

5003. Have you in Committee Room D, where there is the facility of gas, got one of your apparatus ready for exhibition to the Committee, to illustrate its different applications?—I have the instrument arranged upon the table of that room at the present moment, if the Committee will oblige me by going down to look at it.

5004. That is one of the instruments you have indicated; the other may be permanently fixed in any place as a test for the presence of gas?—The "others" may be permanently fixed instead of the "other."

5005. You received a communication, did you not, asking you at the instance of Dr. Percy to attend in the Southwark-street subway, to test the result of allowing coal gas to escape?—I did.

5006. And you have made many experiments in that subway upon that suggestion?—I have.

5007. Will you explain to the Committee shortly what those experiments were; you commenced, I think, on Saturday afternoon?—On Saturday, at 10 o'clock in the morning.

5008. Will you first of all give the experiments which you then carried through?—The first experiment was made with a jet of 3-16ths opening; so I was told; I did not measure it; and being perpendicular.

5009. What was the result?—Dr. Frankland, I think, took the readings in the centre of the subway; I took one position towards the Blackfriars Bridge end. I took one ventilator there; and at that point, after the gas had escaped five minutes into the subway, I found 7-10ths of 1 per cent. of gas; that is point 7; at the end of the second five minutes I found still point 7; that is, 7-10ths of 1 per cent.

5010. *Chairman.*] It had not been changed, in fact?—It had not changed; at the end of the third five minutes I found 1 per cent.

5011. And so it ended, in fact?—Yes; that ended that series of experiments.

5012. Mr. *Wilkinson.*] For 15 minutes?—For 15 minutes.

5013. That was the duration of the first experiment?—Yes; at the end of the first experiment a certain interval was allowed to elapse until the subway became clear.

5014. Now will you state the second experiment?—The second experiment was made by a jet of 5-8ths of an inch diameter.

5015. That was the opening directed by Dr. Frankland, was not it?—Yes.

5016. Dr. Frankland having been requested by Dr. Percy to take charge of the experiments?—I called upon Dr. Percy to ask him what he thought would be the best to do, and he thought that my experience was quite sufficient if I would do what I thought was necessary, he would be satisfied of course provided there was enough done; when I told him that the five-eighths of an inch pipe was proposed to be used, he thought that would be large enough.

5017. I thought he suggested half-an-inch?—Yes; but he thought that five-eighths

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eighths would be quite large enough for everything and everybody, and he would be quite satisfied with that.

5018. Will you give us the result of the second experiment; how long did you maintain it?—The first five minutes the gas was turned on, and Dr. Frankland tapped the pipe with a hammer.

5019. As a sort of sign indicating the commencement of the experiment?—Yes; and five minutes from that time, I took the per-centage of the gas at the same place; that is near within 18 inches of the ventilator, and I found 1·7 per cent. of gas; at the end of the second five minutes, I found four-tenths of one per cent.

5020. *Chairman.*] That was less?—Yes, less; at the end of the third experiment no gas at all, but pure atmosphere.

5021. Mr. *Wilkinson.*] At the end of the three five minutes?—I made the first, second, and third experiments, at intervals of five minutes.

5022. Did the second experiment last a quarter of an hour?—The second experiment lasted 15 minutes.

5023. I do not know that I need take you in detail; how many experiments did you make in the day?—Dr. Frankland left at this point, having important business to attend to, and he left it with Mr. Campbell and myself to continue these experiments.

5024. Up to what time of day did you continue those experiments; we went to dinner at seven o'clock; say from two o'clock till seven; those are the only experiments I have recorded.

5025. Without taking you into detail through all these experiments, and leaving my learned friends to do that if they like, was there one experiment which you conducted on Saturday which lasted an hour?—Yes.

5026. Will you tell us when it began, and give us the results?—It is rather a puzzle to say what time it began, because I did not put it down, but I believe that perhaps it was about four o'clock in the afternoon; I would not like to say positively, but that was the time, probably, when it began, and ended at five.

5027. The duration you have no doubt about?—No; it is all written down; this is the note book which I had in the subway; the jet was the same that had been used before, namely, 5-8ths of an inch in diameter; the gas was allowed to flow 10 minutes; at the end of the 10 minutes I took the amount of gas at the same point at which I had been standing before, and I found 1·3 per cent.; at the end of the second 10 minutes I found 2·5 per cent.; at the end of the third 10 minutes I found 2·4 per cent.; and at the end of the hour 1·70 per cent. We tried three experiments of 10 minutes each apart, and then we left it for half an hour, and again tried, because it was thought by Mr. Campbell and myself that if we allowed the subway to remain perfectly quiet, it would be the same as if the accident had happened; no person being present, we thought it was fairer to experiment in that way.

5028. Do I understand you, that you did not find the amount of per-centage increased with the continuations of the experiments?—We did not; in fact it diminished towards the end of the hour, and it is very funny how the gas got away as it was in the subway.

5029. It diminished?—At the end of the hour it was 1·70; it was 2·5; it went down to 2·4, and it then went down to 1·70.

5030. Mr. *Jackson.*] The maximum being 2·5?—2·5 being the greatest; the fifth experiment we made a quarter of an hour later, and we found that it was 1·5 per cent.; that would be the duration, an hour and a quarter, that this experiment was going on, the testing lasted an hour and a quarter.

5031. *Chairman.*] The gas flowing all the time?—Yes.

5032. You are sure that the gas was flowing all the time?—I am perfectly certain, because I walked up to the jet once; I moved very cautiously; being accustomed to move in a pit; one knows the way to walk; you walk on your arms, and carry your body low; I approached the jet, and tried it with the indicator.

5033. Mr. *Wilkinson.*] From time to time you tested it, in fact?—Yes; I was satisfied that gas was coming out, and I was perfectly satisfied that it was coal gas by the indicator.

5034. Mr. *Paull.*] What was the per-centage at the opening?—If you will allow me, I made a series of experiments upon that point which we will come to in a moment; I prefer to take them in the order.

5035. Mr. *Wilkinson.*] Before we leave this day experiment of Saturday, what was the light that you conducted the day experiment by?—I must tell you that I had suggested using the Davy lamp in the day; it was thought there perhaps might be some danger; in my own experience fire-damp seldom flows through the gauze of the lamp, but, in my own experience, I have had explosions through the Davy lamp of coal gas, and therefore it was thought not very wise to run any risk; under these circumstances we thoroughly tested the subway with the indicator to see that it was not explosive. Having satisfied myself that the subway was not explosive, we went into it; we worked up to this time by reflectors from daylight; reflectors which lighted the whole of the subway.

5036. *Chairman.*] You examined the indicator by reflected light?—Yes.

5037. Mr. *Wilkinson.*] Did you find the reflected light sufficient to enable you to examine the indicator that was used?—Certainly.

5038. I need hardly ask you whether it would require rather a considerable degree of light to enable you to examine so delicate an instrument as that?—No, it does not; I have not a Davy lamp here, but I have one below; but the Davy lamp gives sufficient light to read it in a coal-pit, where it is darker very much than it is in the subway; and I have frequently read the indicator by the lamp when it is down very low, when we were, in fact, in the presence of fire-damp, so that you may guess that we did not have it any higher than was safe.

5039. Was the light sufficient to enable you to prepare these notes?—Yes.

5040. At that time you had no artificial light?—No artificial light had been allowed.

5041. You took the per-centage at a point near the orifice, and also near to the roof, did not you?—Yes.

5042. Then you will give us the difference between those two points presently?—I would rather, if you would allow me, speak now of what occurred when we came back to the subway after dinner on Saturday.

5043. Now, we will conduct you to the experiment which took place on the evening of Saturday?—Yes.

5044. At what time did it commence?—We went back about half-past nine, as nearly as I can recollect; I think you might safely say half-past nine; there had been a good deal of discussion amongst us as to the necessity of stopping the street; I must tell you that I proposed to go far in excess of what Dr. Percy had sanctioned; I proposed to open an inch and a half pipe, which supplied the gas which we had been before using; that was a jet which measured an inch and a half, that I am certain of, as I measured it myself, and it was determined, for safety's sake, that the traffic should be stopped, because we had not tried such an experiment before, and it was deemed wise to be on the safe side; by means of a limelight, the subway was lighted by reflectors the same as it would be by sunlight.

5045. Merely substituting the limelight for the sunlight?—Yes; so that there should be no artificial light inside the subway.

5046. *Chairman.*] No fire?—No fire. Then Mr. Campbell, Mr. Jones, my assistant, and myself, were present in the subway; I believe there were two gas men, I am not certain, but one or two; I suppose it is of no consequence; there were either one or two gas men there; I asked Mr. Jones if he would direct the removal of the cap which closes the main pipe, the cap screwed on to the end, and he removed that cap. Then I asked Mr. Jones if he would be so kind as to take charge of the tap, because there was a large handle, as long as that with which he opened the pipe, and he allowed the gas to flow for one minute; at the end of the one minute the quantity of gas was so small that it just smelt; you could smell it strongly, that is all one could say. I walked carefully between the ventilators and it was the same throughout. At the end of a few minutes, say 10 minutes, when the subway had become clear, Mr. Jones, at my request, opened the same tap, and allowed it to remain open for 20 minutes; at the end of 20 minutes I lit the gas, this being the side towards which the ventilation was coming, the tap being there, and the ventilation being here at the crown of the arch (*describing the same*); and there I found 2 per cent. of gas at the ventilators; I must tell you that there was a ventilator there, but that was stopped; that was a little square hole.

5047. That was one of the ventilators to which reference has been made leading off to the lateral passage?—Yes; but we stopped it up; I then scratched a lucifer and made a light; I then lighted the Davey lamp, standing opposite to the

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the jet, as it may be opposite that gentleman writing, and lighted the Davey lamp; I advanced the Davey lamp to the proper point for testing fire, and the lamp showed no sign at any place; there was no cap upon the flame at all and there was no indication of any gas; I tried it all along the whole distance between the two ventilators, and I found no gas; I lowered the lamp and held it the height of my third waistcoat button, and carried it along level in this way, right along the subway; when I got opposite to the jet, I knelt down and gradually brought the flame nearer to the jet, until I could see fire in the lamp; the point at which the lamp showed gas was exactly 24 inches from the jet, and the reason of my knowing that is, that I put one point of a two foot rule into the jet, and I put the other point of it to the Davey lamp opposite to the flame of the lamp, therefore, it was exactly that distance, the lower edge being put there and the flame was here (*describing the same*); I allowed the distance of the pipe so as to get the exact distance.

5048. So that you tested at many intermediate spaces?—I did; I then took my indicator to be perfectly certain that the gas was there, and that there was no deception in the case, and I found that there was 100 per cent. of gas coming out from the main; I then lowered the Davey lamp to within 12 inches of the jet (a measured 12 inches that was), and at that point the lamp was extinguished.

5049. Within 13 inches of the jet?—Yes; Mr. Campell and Mr. Jones, I must say, left it pretty much to me; they seemed to think that I knew certainly what I was doing; they had very little doubt upon the matter; they thought whether it would be wise that we should carry on these experiments; I assured them it was perfectly safe, and that no harm would happen. I therefore took off the top from my Davy lamp, lighted the candles, and then, with a lucifer, standing a little on one side, dropped the lucifer into the gas that was issuing; the flame did not singe me in the least; you may see by my hand the hair is still on it; that is the best proof I can give that there was no explosive mixture about, or a man could not reach to throw a lucifer in.

5050. That you succeeded in doing?—I did; and there were witnesses who saw it; I measured the flame, and it was five feet six inches long; you know a flame licks in this way. I took the bottom of the lick and the top of the lick, and took an average.

5051. To leave no doubt about it there was a very considerable flame without any explosion?—Quite so.

5052. What was the maximum per centage you obtained in the night experiments?—The maximum we obtained in the night, outside everything, was two per cent., do not understand me to say the maximum I obtained, because what I obtained was 100 per cent at the jet; but I am speaking of the crown of the subway.

5053. And these experiments were made throughout with a one and a half inch opening?—Yes; with one and a half inch opening.

5054. Supposing that the gas escaped slowly for some hours before it reached an explosive point, your indicator would detect it, would it not?—It would do so; consider this pen to be a jet of gas, and supposing there should be a leak of gas of such a size, and supposing that should go on, say for four hours, it would take four hours before the amount of gas issuing from that jet would make a mixture which would be explosive in this room, and my instrument would indicate it; it would give warning before that point was reached; that is an important point, because many chemists have not yet seen my instrument, and they do not think so, but after having seen my instrument they do think so.

5055. Mr. *Duff*.] What part of the subway were these experiments tried in?—What I call the evening experiments in the Southwark-street subway were at all parts.

5056. When you spoke of no gas at all escaping, of course you meant that there was none escaping at that particular part of the subway; there must have been some somewhere else?—I do not quite understand the question.

5057. You said at one time when the jet was opened you found no gas?—I found no gas, and this would be my explanation: When the door which led into the subway was closed, the ventilation, instead of being wholly through the ventilator's upcast, was downcast in some and upcast in others; and that would alternate between the two with frequent alterations, and therefore the gas was swept backwards and forwards and sometimes cleaned out; sometimes at one ventilator one would find no gas at all, and five minutes afterwards you would find gas there and none at the other ventilator.

5058. Mr. *Jackson.*] Still it escaped?—Yes; it escaped, or I would not have lighted candles.

5059. Mr. *Wilkinson.*] Now, to direct your attention to Monday's experiments; we have had some of the gentlemen named who were present there with you in the subway on Monday?—Yes.

5060. I dare say some of them were, perhaps, unknown to you at the time?—Yes; in fact, many unknown to me.

5061. However, you had Dr. Frankland, and one or two others with you?—Yes. Dr. Frankland, Mr. Bramwell, Mr. Jones, Mr. Hemans, Dr. Letheby, Dr. Odling, and I saw Mr. Hawksley the younger, and Mr. Upward; I recollect Mr. Upward, because he and I had been together in the morning experimenting.

5062. Besides two or three lawyers?—I beg your pardon, and one Counsel, Mr. Wilkinson.

5063. Now, will you give the Committee an account of the experiments on Monday?—On Monday morning Dr. Frankland went with us, and we made experiments by first opening one pipe on the ground; then we tested the gas, and we found 2 per cent.; the fact is, I have not recorded those; I am speaking from memory upon this particular.

5064. You heard Dr. Frankland give his evidence?—Yes.

5065. I am sure you will not think it necessary to repeat what he said; you confirm what he said?—Entirely.

5066. If you are merely now going to give us the same details which he gave, I will not trouble you?—The only difference would be this, that at my point of observation, which was the ventilator, I got a slightly different result from Dr. Frankland, because I was in a different position. I will give you those figures if you will allow me.

5067. If you please?—The experiments were of a quarter of an hour's duration each. At the end of the quarter of an hour, when both pipes were opened, I, standing at the ventilator, found half of 1·5 per cent. At the end of half an hour, there was still a half per cent. At the third experiment, which was at the end of another quarter of an hour, we found 2·30. Perhaps I may say I think that the lowest explosive point appears to me to be somewhere about 7 per cent., between 6½ and 7 per cent. It is somewhat difficult to determine with nicety the exact point of the explosion. I saw Dr. Frankland light the gas, and I am certain it was gas that was issuing from both pipes.

5068. A very strong body of flame?—The flame was about 5 feet high on each side.

5069. Mr. *Jackson.*] Was there no ignition between the two?—There was no ignition between the two; when I lighted it in the morning, I thought there would be an ignition between the two, but there was not; I lighted it first on this side myself, and then on the other.

5070. There could have been no gas in the upper part of the subway?—None.

5071. Did the flame ascend to the spring of the arch?—When it was first lighted, it burst out.

5072. Would a five-feet flame carry it above the spring of the arch?—I do not know what the spring of the arch is; do you mean the top.

5073. Where it starts from?—Yes; certainly, very much indeed; supposing this should be the arch, it reached to there (*describing the same*). There was one curious fact, if you will allow me to mention it, which I tried while the ventilation was coming towards me, coming this way; I sat in front of the inch and a half jet; this was not the afternoon, this was on Monday morning, Mr. Upward being present. Holding the Davy lamp in front of me, I brought it gradually nearer to my body, and although there was nothing to show in the lamp at all at this distance of about 18 inches, when I brought it to this distance, which is half way, there was a cap which reached to the top of the gauze, and when I brought it to my body the lamp exploded; it was fired. The reason of that was simply that my body made an eddy, and the gas accumulated here in pools. I mention that, because I wish to explain what I did not see, but what I was told of, that at one point, when Dr. Frankland lighted the gas, there was a little blue ignition on the top of the arch. My opinion is, that the gentlemen who were standing there made little eddies, and carried up more gas than was due to the place at that particular point than when that gas was ignited. The experiment which I made in the morning enabled me to form that opinion.

5074. I understand the short result of your day's experiment on Monday was, that

G. F. Ansell, Esq. that the amount of gas which you set escaping by the uncoupling of both those service pipes, was about 2 per cent. ?—Two per cent. was the amount I found; 2·30 was the largest, that is less than 2½.

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5075. Now let me ask you the same general question asked of the other witnesses: have you any doubt, from the result of these experiments, that a subway such as this in Southwark-street may be employed with safety for the reception of gas pipes?—Perfectly; I should have no hesitation at all to be in that subway with a 9-inch pipe wide open; I offered to be left there yesterday with it open.

5076. *Chairman.*] A 9-inch pipe wide open?—Yes.

5077. Mr. *Jackson.*] Emitting gas?—Yes.

5078. With the pressure of gas on?—Yes; a 9-inch pipe with the pressure, I will undertake to be there this evening; I would be there alone; I would be perfectly cautious in what I was doing, because my opinion is that it would not reach any more than five per cent. of gas at the top.

5079. The rest would be carried away?—The gas, in rising, forms a current of its own, and makes, as it were, a balloon, and, by the friction of its own motion, carries the air out of the subway, and then fresh comes in to take its place; I believe an escape of gas creates ventilation exactly the same as warming with hot water pipes in the House of Commons.

5080. Is it the fact that your indicator may be connected with outside places such as police stations, or any offices, so that there may be always present in a convenient and accessible place, a mode of testing the state of the gas, and the mixture, the atmospheric state of the subway?—Yes; certainly, beyond all dispute.

5081. Mr. *Jackson.*] You undertake in the office of any colliery, to give the state of the workings below?—I do.

5082. You have done that very frequently?—I have.

5083. Mr. *Wilkinson.*] Then there would be no difficulty in doing it, in the case of a subway?—Less difficulty in a subway than in a coal pit.

Cross-examined by Mr. *Denison.*

5084. It appears that you would have no hesitation in advising the Metropolitan Board to take all the responsibility of this?—Certainly; I would take it on myself; beyond all dispute there is no responsibility at all in it. I may say that Mr. Hawksley, junior, was watching by the side of me during the time of making my experiments on Monday, and he did not dissent from my results.

[The Witness withdrew.

Mr. *Rodwell.*] I should state that Dr. Percy is in the room; he has not heard the whole of the evidence; but something was said about his not being here; I do not propose to call him; I only state the fact that he is in the room.

Chairman.] We understood that Dr. Percy's public engagements were such that he could not attend personally; that of course is an answer to anything that may have been said.

Dr. *Henry Letheby* called in; and examined by Mr. *Denison*, as follows:

Dr. *H. Letheby.*

5085. I THINK you have some public employment at the present moment; I forget the name of it; in connection with testing gas; have you not?—Yes; I have.

5086. Be good enough to tell the Committee what it is?—I am gas analyst for the City of London.

5087. You were one of the witnesses, I think, for the City Bill, against the companies, last year, were you not?—Yes; I was.

5088. Now I believe you were caught in a manner "promiscuously," as the old women say, going to this experiment, were you not?—Yes; I was.

5089. When was it?—Yesterday.

5090. At what time of the day was it?—It was about a quarter to three o'clock, I think.

5091. Now I believe that you went into one of those subways, did you not, in Southwark-street, and witnessed the experiments that were made?—Yes; I witnessed them in detail.

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5092. And will you be good enough to tell the Committee what is your opinion with respect to their conclusiveness?—They appear at first sight to be very remarkable experiments; but, upon a little consideration, we cannot help concluding that they are very unsatisfactory, and can lead to no positive judgment with respect to safety or otherwise. In the first place we have no knowledge of the quantity of gas that was actually escaping in that area. Since we have been in the room Mr. Hawksley has made calculations upon the size of the apertures and the pressure at which the gas was escaping. If there had been no opening at all, if the whole of that gas had been confined in that space it could not have amounted to more two per cent.

5093. All that could come out in the time that the experiments were made?—Yes.

5094. *Chairman.*] That is not your calculation?—No, it is not; I was satisfied, there being no feeder indicating the quantity of gas escaping from these apertures, that we had no sufficient data upon which to form an opinion.

5095. What was the state of the pressure?—As far as the indications go, I was watching one of them very carefully at the ventilator openings; they were as given by Mr. Campbell; those per centages of gas.

5096. Have you the means of knowing what the pressure was; how many tenths of an inch from the gas pipes?—The pressures were obtained by Mr. Sugg, who told me that in one of the experiments the pressure fell from 9-10ths to 45-100ths; and I was informed that that main of 18 inches in diameter, which appeared a very large gas main, was actually supplied only by two pipes of only a half inch in diameter. Therefore the aperture there must have reduced the pressure of the gas very considerably in the course of the 15 minutes that the experiment was being made.

5097. It is a very different thing from what it would have been if the main had been connected with larger mains than through this small stricture, if I may so call it?—Unquestionably; it does not appear to me that you can form any sound conclusion at all from the results of experiments made in the way that they were made here by an 18-inch main supplied with a little service pipe of this description; unless we know the quantity of gas actually escaping in that way by meter experiment, we cannot form any opinion about it.

5097*. Although you cannot tell accurately, you can tell us that it would be a very small quantity compared with what would be a leak in a large main?—A large quantity compared with what would take place in a leak at a joint; but that very much depends upon the size of the main and the fracture at the leak. I may mention that it was so warm that I was obliged to stoop to allow it to pass over. My experience showed me this; that as regards the first experiment that they had, the subway was in an unnatural condition; that it had established an artificial ventilation; that, I believe, as Mr. Ansell says, if you had opened a 9-inch main and warmed it, the place was sufficient to carry it off.

5098. You believe all the subsequent quarters of an hour to be what this is?—The results show that, because we find from the first experiment that we have diffused the gas so considerably by reason of the heat of the burning gas, that we had created a very artificial condition of that subway; we had, so to speak, an artificial ventilation of it.

5099. Now, do you think that the gas would diffuse itself through the subway if a leak were to be established?—When gas diffuses itself, it does not pass into the surrounding atmosphere so fast by diffusion as it does by its actual gravity.

5100. But you think that it would diffuse itself?—Oh, yes; but not very fast. I may mention that I have inquired into the causes of most of the explosions in London during the last 20 years, and I have found that it is not so much the diffusion of the gas as the mixture of the gas with the currents, that has a tendency to produce danger, except the leak is very small and the atmosphere is confined.

5101. Upon the question generally have you formed an opinion, and do you think these places are fit and proper places to put gas pipes into?—The impression upon my mind, derived entirely from what I have seen, is, that they are not.

Cross-examined by Mr. *Rodwell.*

5102. These experiments prove something, do they not?—Yes, they do prove

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something; they prove this: that you can venture to open a pipe in that subway, I think about half an inch diameter, issuing from a main under a pressure of about one-half of an inch of water, 45-100ths of an inch of water, and that in a quarer of an hour the atmosphere was not dangerous.

5103. There are two one inch and a half?—Yes; but they were made at a time when the atmosphere was so heated by the flaming of the gas in the previous experiment, that I formed no opinion of the results.

5104. You had no thermometer, I suppose?—It was so warm that I was obliged to stoop.

5105. When you were on the spot, and saw the experiment going on, did you suggest these difficulties to anybody present?—I began the suggestion of them at the beginning, but I was stopped at once, and told that I had been invited there to witness the experiment.

5106. And not to discuss it?—No.

5107. Who said that?—A gentleman whom I saw just now in the room; there is the gentleman (*pointing to a gentleman*).

5108. May I ask you did you go there as an amateur?—Yes, I did.

5109. You know Mr. Bramwell, do you not?—Yes; I was told that we must have no discussions upon the subject; I was told that we had met for the purpose of witnessing the experiments, and that Dr. Franklin would perform those experiments.

5110. Then I ask you did you go as an amateur?—I was asked by Mr. Baxter's agent.

5111. I thought you said a little while ago, in answer to a question put to you by my friend Mr. Denison, that you went there promiscuously?—I did; I was met at the House of Commons, and was asked to go there.

5112. But you went there, unquestionably?—Oh, yes, I did.

5113. Viscount *Galway.*] Were these pipes full when the experiments were begun?—Oh, yes; but the pressure of the gas at the beginning of the experiment was the pressure, I suppose, in the street main, nine-tenths of an inch, but directly the aperture was made in the main, the pressure fell to half.

5114. *Chairman.*] Who ascertained that?—Mr. Sugg; he was watching the pressure; the gas agent; from him I obtained the results, and Dr. Odling also.

5115. Mr. *Jackson.*] The supply must have been equal to the delivery?—Yes; but still the pressure fell.

5116. There was a quantity of gas emitted?—Yes; but it was not at the pressure mentioned here.

5117. When the subway got so hot it would find its way out afterwards?—Yes.

5118. *Chairman.*] How?—Through the ventilators. In ascertaining what would be the effect of letting loose into that subway gas from two and a half service pipes, at the pressure of the street main, nine-tenths, the results do not indicate what they would be under different circumstances, because we had an uncommon condition of the subway. It was so hot from the previous experiment, that the gas rising to the crown was delivered away. Therefore I do not think you can draw any conclusion from the results of that experiment. If you ventilate a subway in such a way as that, the gas shall be carried away as fast as it is delivered; it may be safe, but I am looking at the condition of things naturally.

5119. Mr. *Jackson.*] If there is a sufficient amount of ventilation at each end?—Not at each end, but at certain places where ventilation is to take place.

5120. You think that that would do?—Unquestionably, if the subways are ventilated freely, and so fast as that they will deliver the atmosphere, whatever may be the proportion of leakage, they will be safe. That is the necessary consequence. At the time when these inch and a half pipes were delivering their contents into the subway, the proportion of gas that would flow from them in 15 minutes, mixing with the air of that subway, supposing no ventilators were open, would not produce in that subway 2 per cent. of gas.

5121. Mr. *Floyer.*] Assuming that a few minutes after the experiments were concluded the air of the subway so changed that all smell of gas had passed away, must not the heated atmosphere pass away in the same way in a shorter time?—Yes; not in a shorter time, because the subway must have been heated by these flames. I do not know what time had elapsed between the making of the previous experiments, but when we entered the subway, before we had made experiments at all upon it, the atmosphere smelt very strongly of gas, which would

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would seem to indicate that there was no very rapid ventilation there under ordinary circumstances.

5122. Did you perceive yourself the difference, that the smell of gas had passed away after you had waited a short time?—No; I did not go out to get, so to speak, a fresh condition of one's nose to determine that; I knew that there was a very strong smell of gas there.

5123. *Chairman.*] Did you hear the account of the experiments which were made on Saturday?—I did; I heard Mr. Ansell speak of them. He said he could only discover at least one per cent., I believe, of gas in the subway.

5124. Would that lead to any flaming or not?—No, there was no heat applied there.

5125. Did you go into the streets for the purpose of seeing whether any gas was escaping?—No, I did not.

5126. You did not fly about?—No, I did not.

5127. Mr. *Floyer.*] Do you know whether there was any perceptible quantity of gas except between these two spots?—Oh, yes; it was in the other subway on the other side side of the ventilator; it passed the ventilator and went on the other side.

5128. *Chairman.*] The other end?—The other side of the ventilator.

5129. Mr. *Floyer.*] To any great extent?—Yes, I should think it was an equal length on the other side; I am speaking of the doorway here (*describing*) in the subway; there is the ventilator here, and another there, and we were making experiments equal way between the ventilators.

5130. Mr. *Rodwell.*] You said, I think, that when the 9-10ths was used for the amount of pressure, that that low calculation ought to have produced four and a half?—It fell to four and a half.

5131. Therefore you say the flow ought to be reduced to one-half?—To more than that. You must ask your gas engineer the proportions of that.

5132. I thought you said if the pressure produced one-half, the flow would be reduced one-half?—No; the proportion of gas delivered from an aperture is dependent upon the pressure.

5133. Viscount *Galway.*] There must be some considerable pressure there?—Gas escaping from an open pipe will, by reason of its lightness, produce a long flame, independent of the pressure actually behind it.

5134. *Chairman.*] That would increase it, would it not?—No doubt.

[The Witness withdrew.

Dr. *William Odlin,* called in; and Examined by Mr. *Clerk,* as follows:

Dr. *W. Odlin.*

5135. You, I believe, are Professor of Chemistry at St. Bartholomew's Hospital, are you not?—Yes.

5136. Now I believe that for the last 20 years you have turned your attention among other matters to that of gas, have you not?—For the last 15 years.

5137. Now you were present at this experiment on Monday, I believe?—I was.

5138. What time did you go to the subway in Southwark-street?—About 3 o'clock.

5139. And upon first entering the subway, did you perceive a strong smell of gas?—Yes; a very strong smell of gas in the subway when we entered it.

5140. And did you learn when the last experiments had been performed prior to your leaving the subway?—I understood Mr. Ansell to say that he was there in the morning.

5141. Now did that smell of gas extend as far as the passage which leads up into Southwark-street?—We went down into the subway and walked about first here in the space between the two ventilators.

5142. And where did you first perceive the smell of gas?—We perceived the smell of gas directly we got into the subway.

5143. You mean directly you got into the subway itself?—Yes.

5144. Now I believe that the aperture was fed by a small service pipe, was it not; it was not a main?—Yes; I should not call it a main. It is a single length of pipe closed at each end, and fed with an inch and a half pipe.

5145. It is a receptacle of gas filled with an inch and a half pipe?—Yes; the pressure

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pressure guage was at a distance of about 75 feet from the opening. That pressure guage, before there was any opening, indicated nine-tenths; when the first opening was made, I mean the 3-8th opening, it fell to about 4¼-10ths.

5146. How soon was that?—As soon as we had the 75 feet; I have no doubt, immediately.

5147. Then did you take any further observation with regard to the pressure?—So that the gas at that time could not have been issuing at more than 4½-10ths, and necessarily must have been issuing at very considerably less in consequence of the distance.

5148. The escape of gas will increase, will it not, according to the square of the pressure?—It will increase according to the square root.

5149. Did you examine what the state of the guage was afterwards?—At the second experiment the pressure guage at this place (*pointing to a map*) indicated 3¼-10ths.

5150. What aperture was there there?—That was the aperture of the pipe showing the lamps, not the pipe at all that is called the main.

5151. And is that connected with the same guage?—Yes, immediately; that gave 3¼.

5152. At that time the gas pipes in the street were not lighted, were they?—No; they were not.

5153. The experiments being conducted in the afternoon?—Yes.

5154. Now, with respect to the normal pressure at that time; the experiments had reduced the pressure of the pipe to 3¼ at that time?—To 3¼ at that time. There is a third experiment.

5155. Be good enough to tell the Committee what that third experiment was?—So that the pressure fell to about 2⅓-10ths, rather under 2½-10ths; if this had been in a main, the opening of such a hole as that would have made very little difference comparatively in the aperture. It is making a hole in an 18-inch main, and a hole in a 1½-inch pipe.

5156. Now, it has been stated here by Dr. Letheby that under those circumstances the experiment was not a satisfactory one to show the real state of things in that subway?—No; it has no bearing to a large main.

5157. And do you agree with that?—I do.

5158. Now, did you perceive yourself to what an extent the air in the subway was heated by the lighting of these flames?—Oh, yes; it was very hot, and very quickly hot.

5159. Did it create a disturbing current in the subway?—No doubt it would create an artificial ventilation in the subway.

5160. The experiments, as far as they went, were satisfactory in showing the small quantity of gas which which was let out, were they not?—There was not enough gas let out to make an explosive mixture.

5161. Now, do you consider any experiment would be satisfactory until you had known that a sufficient quantity of gas was let out which might, when mixed with the air, have made an explosion?—Certainly not. I might observe, that according to my observations with Dr. Franklin in the second experiment, where we had a hole of an inch and a half, the atmosphere was less moved than where we had 3-8ths.

5162. At that time the pressure had been diminished more than one-half?—Yes; it came to this, that the larger the hole, the less the gas.

5163. In the last case the escape was from the long pipe?—From the long pipe.

5164. Of an inch and a half diameter?—Yes.

5165. Now, did you know how far the gas extended along the subway beyond these ventilators?—I did not notice, in the beginning of the experiments; I confined myself to the space between the two ventilators.

Cross-examined by Mr. *Rodwell.*

5166 Did I understand you to say that the escape from the half-inch opening was more perceptible than from the inch and a half opening?—The instrument moved through the indication of 76·8.

5167. Without going into all that, will you be kind enough to tell me?—I cannot. It moved from 76·8 to 77 in the first experiment, which indicated 2, and in the second it moved from 76·8 to 76·9.

5168. *Chairman.*] It was not your experiment?—It was not my experiment.

5169. Mr. *Rodwell.*] But is it not also a fact that the larger aperture was much lower than the smaller one?—Yes; there was a difference, something short of two feet.

5170. Then I ask you, would not that account for it, having more space to diffuse?—I should say certainly not.

5171. Now, I suppose that no experiment would have been satisfactory to you unless there had been an explosion, would it?—That would have been most satisfactory, certainly.

5172. That is what you expected, is it not?—That is what I could have got, I have no doubt.

5173. Now, I understand you to say that you did not go promiscuously?—I had a summons in the morning to attend and look on.

5174. If I understand rightly, the result of your evidence is this, that there may be a considerable amount of gas escaping into the subway which will not lead to an explosion under the present system?—Undoubtedly.

Re-examined by Mr. *Clerk.*

5175. I suppose you would have liked to see as much gas let out as would have caused an explosion?—Yes.

5176. But here there was not a sufficient quantity of gas which would, under any circumstances, have caused an explosion?—We all know very well that 67 per cent. is the smallest quantity of gas that will produce an explosive mixture. Here you have 150 feet and 60 feet area. Unless you let sufficient out, you stand no chance of getting an explosive mixture.

5177. Or getting anything which could have approached an explosive mixture?—Exactly.

5178. Therefore the result is this; how that an explosive mixture could not be made?—Yes; that is what I take it to be.

5179. How the thing could not be done?—Yes.

5180. Mr. *Floyer.*] You think it would have been necessary that the whole of the subway should have been filled with the explosive mixture before any explosion could have taken place?—Oh, no.

5181. You think it possible, in other words then, that such an explosive mixture can be made in any part of the subway, while the rest of the subway remains not filled with the explosive mixture?—I think so; I think you might get explosive mixture in the side arches.

5182. Leaving those side arches out of the question, looking at the subway in its area, do you think that there could be a collection of explosive mixture in the one part without the other part being affected?—Supposing there was, at any time, a very small or practically no ventilation, it would be. One place where the gas issued was highly charged, it would be inflammable; then, a further distance off it would be uninflammable, and not explosive; and then, in a third case, it would have explosive proportions.

5183. I understood you to say, the reason you thought the same amount of gas was not wanted to get an explosion was that the quantity in the pipe escaping was not sufficient to affect the whole of the subway?—There was a large hole in the roof here (*describing*), and another there, and there was not sufficient gas allowed to escape at all to make this intervening space at all explosive. Here and there it was slightly explosive, if you come to strict accuracy, but at the same time to no practical extent.

5184. In point of fact it was not sufficient to make an explosive mixture extending between those points?—Exactly so.

5185. *Chairman.*] Did you suggest that that was not sufficient to cause an explosion?—I laughed at them.

5186. But you did nothing else?—Nothing else.

5187. Mr. *Bagwell.*] Leaving all ventilation open, what would you have done?—If I could have had a main there with a pressure of an inch, or there might be a pressure of two or three inches, and made such a hole as that, then no

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no doubt I could have got an explosion. That experiment furnished three per cent.

5188. Now it has been told the Committee, and it seems reasonable that the greater pressure of gas would make it go out; in your judgment would that be so?—It is not so much the pressure as the quantity.

5189. Mr. *Jackson.*] A 9-inch pipe it was said would not be sufficient to cause an explosion?—That is Mr. Ansell's opinion.

5190. But it is not yours?—It is not mine.

[The Witness withdrew.

Mr. *Thomas Hersey*, called in; and Examined by Mr. *Denison*, as follows:

Mr. *T. Hersey.*

5191. You are Inspector of the Imperial Gas Company, are you not?—I am.

5192. Now, before I go into the general topics, I dare say the Committee would like to have these quantities worked out; you have made a calculation of the quantity of gas that comes out of these holes, have you not?—Yes.

5193. Now, just give that calculation; I have got your figures here, but you have some more, I dare say?—No, I have not; I calculate that if the whole of the gas that those two-inch-and-a-half pipes could have delivered with the nine-tenths pressure that there was, it could not have raised it more than to 2½ to 2¾ per cent. upon the area between the two ventilators.

5194. That would be 5,600 feet, would it not?—Yes; it works out 5,600 feet.

5195. Now, you of course know the quantity of gas that would go out in a given time under nine-tenths pressure, do you not?—Yes.

5196. If the pressure were reduced to less than one-half, of course the quantity going out would be still less?—From nine to four-and-a-half it diminished one-third.

5197. And from nine to three-tenths?—To two-and-a-half.

5198. What diminution in quantity would that be?—It would be nearly two thirds less.

5199. So that taking the whole facts together, there would be much less gas going out than would have filled that slice, if I may so call it, of subway to the extent of 2½ per cent.?—Yes.

5200. Without any ventilation?—Yes; 2·8 is the maximum it could possibly have been, and the minimum for explosure 7.

5201. *Chairman.*] There were two openings, were there not?—Yes; and I have taken the maximum.

5202. You have taken the maximum of the two openings?—Yes; of two-inch and-a-half pipes.

5203. Mr. *Denison.*] Has anything that has happened altered the opinion that you gave upon this subject in the year 1864?—No; nothing has happened to alter it; and my opinion is confirmed by this and the explosion that occurred in Paris some time ago.

5204. You, of course, know what M. Belgrand has said upon this subject, do you not?—Yes.

5205. Now, you have seen another letter from M. Belgrand since he was here, have you not?—No, I have not.

5206. Now, be good enough to tell the Committee how many miles of main have the Imperial Company during the last three years laid?—Fifty-four.

5207. And how many service pipes?—Upwards of 13,000.

5208. We hear a great deal of the amount of inconvenience of this; will you tell the Committee in what streets have you actually stopped the traffic with all this work?—Not in one.

5209. Have you had any injury to workmen or anybody else?—Not to either workmen or passenger.

5210. Now Mr. Isaacs gave some evidence about the payments of the companies to his parish, for paving in the Holborn district; I think he said that it occupied 20 miles?—Yes; and that the payments had increased materially.

5211. What do you say about that?—Ours have diminished about 20 per cent. in three years.

5212. And how much are they; 52 *l.* 2 *s.* 11 *d.* I have got for three years ending 1863?—The amount they paid that Board was 52 *l.* 2 *s.* 11 *d.*

5213. Is that the average of three years?—The total of the three years; for the three years ending 1866, it is only 43 *l.* 9 *s.* 2 *d.*

5214. In the latter case there is an average of 14 *l.* a year?—Yes.

5215. Now, do you know how many miles of streets you do supply in that district?—Yes, about six or eight.

5216. Now, we have had Mr. Jones here, and among other things he said that he considered that pipes laid in the ground would not be sound 24 hours after they were laid?—Yes.

5217. Do you agree with him in that statement?—No, I do not.

5218. Is that your experience?—No, it is not.

5219. What is your experience?—In the month of April or May last, we had a request from the vestry of Marylebone, asking us to examine our mains in the Portland-road, as they were about to repave that road. We did so, and the company expended a considerable sum in complying with this request; but upwards of a thousand joints were found to be in a perfect condition, only 11 at all leaky.

5220. And how long had those been in the ground?—Upwards of 40 years.

5221. Now, do the Imperial Company always take every possible opportunity of the streets being stopped from any cause to do this work?—Yes.

5222. You put off your work as long as you can?—Yes; to meet their views.

5223. Mr. Jones talks about the expense of laying the mains in the Southwark subway, and he thinks that it can be done for less than the mains are ordinarily laid for?—Yes.

5224. And Mr. Easton said the same?—Yes.

5225. Now what do you say to that?—I do not think so. He said that the 18-inch main would cost 5 *s.* 3 *d.*, and something else for chairs. Our contract price is 6 *s.* 6 *d.* With regard to the 9-inch main, he makes it 2 *s.* 5½ *d.* Our contract price is 2 *s.* 6 *d.*, and we should have to pay for chairs.

5226. So that his cost would be greater than yours, in point of fact, would it not?—Just so.

5227. You, of course, are aware that there is a question of superintendence?—Yes.

5228. And do you believe that that would be more expensive than at present?—Yes; I am sure of it.

5229. Do you agree with the witnesses who said that when men are working in the open air, they feel they are superintended without knowing it?—I do.

5230. And in the subways how would that be?—In the subways I think there would be very little inspection.

5231. The men would be idle, you think?—There would be a great deal of idling there, I think.

5232. Now with reference to the mains and pipes laid down at present, do you agree with other people on our side, that when they get tolerably full, the expense would increase very largely indeed?—No doubt it would.

5233. Do you believe that it would be possible when a subway was occupied specially, to get large pipes into it without breaking a hole?—We could not, either in the crown of the subway or a large hole in the sides.

5234. Now amongst other things, I asked Mr. Jones about making side connections, and he pretended not to understand what I meant by "side connections;" let me ask you how do you think they could be made?—They could not be made without breaking away the subway to a considerable extent, and opening the ground down to them to the extent of 10 or 12 feet, instead of to the extent of 2 or 3 feet, as at the present time.

5235. Have you seen the reflectors in the subway?—Yes.

5236. And do you think they will enable work to be done without artificial lights?—No; you could not see the mains nearest the wall, nor into the side passages at all.

5237. Now, another point has been the level of the pipes; is it necessary to lay gas pipes on a slope?—Yes.

5238. If that is done, would not that occupy the subway still more?—Yes; they must necessarily rise and fall in the subway. We cannot do with less than a quarter of an inch rise in a 12-inch pipe.

5239. Now, how would that work out in the Southwark subway; what difference

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ence of level would you want to add?—We should rise a foot in 200 yards, for example; you descend again, and then rise three or four times.

5240. And supposing you cut it into two?—Then we could not do it; there would not be rise enough.

5241. How many would you add to it?—Not less than four.

5242. Now, just that we may get a right view of the subway, it would occupy much more room, would it not?—It would; and there must be room under the pipe to get the syphon into; that would be two feet below the body of the pipe.

5243. *Chairman.*] Is all that done in the streets?—Yes; but not so frequently, as we can take the rise and fall of the streets. We have upwards of 5,000 syphons in use.

5244. Mr. *Denison.*] Now about current. You cannot get such large currents in a subway as you can get in a street; is that of great consequence?—It is not of so much consequence to us at it is with respect to water.

5245. Now, we have talked a good deal about explosion; you sometimes have experience of the men getting ill, have you not?—Yes; we very frequently have the men partially suffocated, so much so as to be insensible for some time; and we had a man die some few years ago.

5246. Now, on the whole, do you think there would be much greater risk of that in a subway than in a street?—Yes; if anything happened we could not get the men up from the subway into the air.

5247. Supposing this thing is forced upon you, do you think that it is unreasonable that those who are confident of the measure being safe should take the responsibility of it?—Yes, I do.

5248. And you are not convinced that it is safe?—No; I am not convinced that it is safe; quite the contrary.

5249. Do you find that juries generally give against companies if they can?—All I can say is that we have been seldom successful in defending a case where we have been called upon to pay for explosions.

5250. In point of fact, have you had to pay for many?—Yes.

5251. What number?—Four, five, or six, the last few years. The maximum amount would be about 1,000 *l.*

5252. Now, I believe it is a fact that you often settle without going to a jury; do you not?—Yes.

5253. Generally, I believe?—Yes.

5254. Now, arbitration is to be the cure for everything; what do you say about that?—Do you mean payment for the rent?

5255. Yes?—I do not think there is anything to arbitrate about. We pay considerable rates for the easement which we have in the streets, which I think would be equivalent to paying rent in the subway.

5256. You know, of course, that the Metropolitan Board wished arbitration to be limited when they wanted to buy up your concern?—Yes.

5257. You paying 10 per cent., they were to buy you up under arbitration not exceeding 10 per cent; that was their proposition, was it not?—Yes; that was their proposition.

5258. "Not exceeding," I think was the phrase, was it not?—I think it was so.

5259. As to saving in maintenance, keeping the pipes going, and so on, would there be any saving in that way?—I do not think there would, any more than would be counterbalanced by the supervision.

5260. Now I see that my friend talked about its being notorious that the Gas Companies lose from 15 to 25 per cent. by leakage; what do you say with regard to that?—The average for London is about 15 per cent. for unaccounted for gas.

5261. But that does not mean leakage through the pipes, does it?—It does not; the leakage through the pipes may be limited, I think, fairly to between three and five per cent.

5262. Now some of the explosions that you have had already have been in the sewers, have they not?—Yes; some have been in the sewers; one so recently as last week. We had to pay a few pounds for a man that was burnt.

5263. The sewers are much smaller than the subway, are they not?—Yes.

5264. Therefore, the quantity of gas accumulating there is much less?—Yes;

besides that there is a flow of water constantly through the sewer, which, of course, assists ventilation.

5265. You have had some demand, also, from the Metropolitan Board as to the way in which you should protect pipes when they go through the crown of the sewer?—Yes.

5266. They require them to be protected in a very similar way, do they not?—We had to cut through the fleet sewer, and we had to put a coating of iron round the pipe, lined with packing an inch and a half thick, showing that he has some fear of getting gas into the sewers, I think.

5267. Now, the sewers being so much smaller than the subways, can any inference be drawn that an explosion in the subway would be a trifling thing?—I think it would be very much larger.

5268. Again, we had this put: there had been an explosion in some railway arches, and that the side was blown out instead of the top; the side is the weakest part, is it not?—Yes.

Cross-examined by Mr. *Cripps.*

5269. You do not like the jury or the arbitrator; have you any third mode to recommend to the Committee of settling the dispute?—I am very well content.

5270. But I ask you, do you know of any third point at all?—I do not. I am very well contented where we are.

5271. You consider that, at the present time, you have certain rights in the streets which have been given you as against the public?—Yes.

5272. Do you suppose that those rights are given you for any other reason than because the matter cannot be done in any other way than breaking up the streets?—I do not suppose it was ever thought of.

5273. Do you suppose they are rights conferred upon you for the use of the public?—Mutual benefit, I should think, for the benefit of the public and the companies.

5274. Those rights are given you, in the first place, as supplying the public, and on public grounds?—Yes.

5275. You have rights in the street?—Yes.

5276. If the exigency no longer existed of breaking up the streets, and any other way were devised, would you have any rights against the public?—I should think so, so long as we have a Parliamentary sanction.

5277. Whatever mode may be devised, you think you have a right to break them up as against the public?—Until Parliament rules the contrary.

5278. Now, a word about what took place yesterday; you yourself were down in the subway, were you not?—I was.

5279. Now, I ask you did you make any suggestion to anybody there that anything different from what was done should be done?—I did.

5280. To whom?—To Dr. Odlin, who suggested to Dr. Franklin that we should have an experiment made in the said passages.

5281. Did you not know when you made that suggestion that there were no side pipes laid there?—No, I did not; I supposed they were prepared to make any experiments that might be suggested.

5282. Now, I ask you, so far as the circumstances enabled the experiment to be made, is it not the fact that the greatest amount of gas was let flow?—No doubt; and the quantity was very small.

5283. You say that the quantity was small?—I do.

5284. You have already told the Committee that you compared the quantity of gas with the quantity of air as between the ventilators?—I did; as between the ventilators.

5285. How do you calculate the quantity of air; by taking the whole cubical contents of the subway?—Yes; without the sideways.

5286. You take it into consideration down to the bottom, and up to the top?—I take the square of the diameter of the subway, and half that.

5287. How much of the cube contents of that (*handing a sketch to the Witness*) did you take?—From the crown to the floor.

5288. Did you not know that the gas was up to the top of the arch, and that the bottom was free from gas?—I heard so.

5289. The

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5289. The explosive mixture would be so much of the air of the subway as was at the top, or it would mix with the subway?—I think it was diffused, not all over, but it was diffused, because it came into the subway; at the further end of it there was a grating open, and I smelt gas in it as soon as ever I came into it.

5290. Now your calculation of the amount of gas not being sufficient is based upon a calculation of the entire area of the subway, is it not?—Distinctly; just the same calculation as Mr. Hemans's.

5291. Now, instead of calculating the quantity of air in the top portion, you have calculated the amount of air at the bottom, is not that the case?—Yes; I should say that that was not one-third sufficient to make an explosive mixture.

5292. What quantity of gas in air would be perfectly perceptible to the smell; would not one thousandth part?—All I can say is that I never tried it.

5293. But I ask you, a thousandth part of gas would be very perceptible, would it not?—I should think not, but I cannot say; I never made the experiment.

5294. Did you never try an experiment for the purpose of knowing what amount of gas in air gives a perceptible smell?—I cannot say.

5295. You never tried that experiment?—I never tried that experiment.

5295*. Now if you had gas in a pipe, would you smell that gas for a long time, even after a current of air has been through it?—Oh yes.

5296. That is to say the smell would remain even if the gas was gone?—Yes.

5297. You tell the Committee that no street has been actually stopped, when you say that you mean that no barriers have been actually put there to stop the traffic of foot passengers?—Both the foot passengers and the carriage passengers could always pass through the streets.

5298. But what difficulty or impediment there was to the traffic you cannot tell?—Yes, I can tell; it was inconsiderable.

5299. You mean that there has been no street actually stopped entirely, is that what you mean?—Yes.

5300. That is to say that it has only been partially stopped?—It has not been stopped at all; there has always been room for one cart if not for two.

5301. Now you say that the superintendence is more easy where the people are working in the open, is it the fact that when they are working in the open, as soon as ever you can, you put the pipe in and cover it up?—Yes; as soon as it can be properly done.

5302. And with regard to some of the pipes which have been laid down a considerable time, you do not know their condition, and you see nothing of them until your attention is called to the state in which they are?—Forty years is a pretty good time, I think.

5303. Now I suppose you find that the wear or tear, or breakage, or dislocation is different in different localities, do you not?—Not very.

5304. Is it greater according to your experience in macadamised streets than in a paved street?—No; I deny what Mr. Bazalgette said about concrete in macadamised roads; there is no such thing.

5305. Is there no difference in the wear of your pipes between, whether it is a macademised street, or a paved street?—No difference whatever.

5306. Do you confirm what has been said by others, that the breakages and dislocations that do occur are from the very heavy traffic going over the streets?—We have very seldom breakages of mains, except very small mains, and that is frequently after the road has been opened for the purpose of making sewers; that is the place where we generally find it; where the road has been opened for that purpose.

5307. I repeat my question: do you find, or do you not, that dislocations of your pipes occur from the heavy traffic going over them?—Probably it would be so.

Re-examined by Mr. *Denison.*

5308. Are there very few, or are there many, of those dislocations?—There are very few of them.

5309. And what sort of proportion would they bear to the whole?—The cost of maintenance of our mains through the whole of our district has not averaged 1 *l.* 10 *s.* per mile for three years past.

5310. And how many miles of mains have you?—We have 600 miles of mains.

5311. Then that is the total of the whole, is it?—Yes.

5312. Now, my friend begins about your rights; whatever rights you have in the streets are rights to occupy them free from rent, are they not?—Yes.

5313. Subject, of course, to Parliamentary control from time to time if you behave ill?—Yes.

5314. Now then, about the suggestion of making a hole in the sideways; there would be no difficulty in putting a pipe from one of these mains into the sideways?—Which pipe?

5315. You said that you suggested making a hole and having an escape with one of the sideways; they would work all Saturday preparing for Monday in their own way; they have had abundant time to make a hole of this description if they had chosen to do so, have they not?—I should say so.

5316. And an india-rubber pipe could have been done more easily?—It could have been done very well in a quarter or half an hour.

5317. But the suggestion was objected to?—It was.

5318. You say that you took the same calculation as Mr. Hemans?—Yes; I made it 5,600, instead of 5,400.

5319. You say that there was not one-third enough gas to make an explosive mixture, if there had been no ventilation at all?—Yes; I do say so.

5320. So that you can afford a little margin?—Yes.

5321. Mr. *Paulk*] With respect to the unaccounted-for gas, you say that the loss from leakage is estimated at from three to five per cent?—Yes.

5322. How was the remaining per-centage to be got rid of?—Principally by condensation, and from non-registration of meters and somewhat more than the proper supply to lamps.

5323. Does non-registration mean that the gas pipes are tampered with on the outside of the meter, and that gas is abstracted?—No.

5324. Is there any loss, or material loss, from the abstraction of gas by the people stealing it?—No; we have not found anything of that sort for several years; we made examples of two or three respectable tradesmen, and that stopped it.

5325. The abstractions that have occurred previous to this have chiefly resulted from injured pipes?—Our experience was that they removed the meter and put a connecting pipe for about two-thirds of the quarter. Then they refixed the meter and we got the registration for that quarter.

5326. Viscount *Galway.*] It would be easier to detect any defect in the pipe in the subway than in the street, would it not?—Certainly it would.

[The Witness withdrew.

Mr. *Denison* stated that he proposed to put in evidence a translation of a letter from M. Belgrand, which was dated the 6th instant.

Mr. *Rodwell* was heard to object to the letter being placed upon the Minutes, upon the ground that he had no oppportunity of cross-examining the writer upon the subject of its contents.

The Committee-room was cleared.

After a short time the Counsel and parties were again called in.

The

9 July 1867.

The *Chairman* inquired of Mr. Denison whether he had finished his case.

Mr. *Denison* replied that he had.

The *Chairman* stated that the Committee had determined that the letter should not be placed upon the Minutes.

[Adjourned to To-morrow, at Twelve o'clock.

Wednesday, 10th July 1867.

MEMBERS PRESENT:

Mr. Bagwell.	Mr. Cornwall Legh.
Mr. Duff.	Mr. Paull.
Mr. Floyer.	Mr. Tite.
Mr. Jackson.	

WILLIAM TITE, Esq., in the Chair.

10 July 1867.

Mr. *Denison* was heard to address the Committee on behalf of the Gas and Water Companies in opposition to the Bill.

Mr. *Rodwell* was heard in reply.

The Committee-room was cleared.

After some time the Counsel and parties were again called in.

[Adjourned till To-morrow, at Twelve o'clock.

Thursday, 11*th July* 1867.

MEMBERS PRESENT;

Mr. Bagwell.
Mr. Duff.
Mr. Floyer.
Mr. Grove.
Viscount Galway.
Mr. Jackson.
Mr. Cornwall Legh.
Mr. Paull.
Mr. Tite.

WILLIAM TITE, Esq., in the Chair.

The Committee-room was cleared.

11 July 1867.

After some time the Counsel and parties were again called in.

The *Chairman* stated that the Committee were prepared to pass the Preamble of the Bill, subject to provisions to be embodied in clauses to be submitted to the Committee to the following effect, namely, that the operation of the Act should be limited to the subways named in the Schedule, that no rent shall be chargeable, and that supervision shall be provided by the Board of Works, in such manner and on such terms as may be agreed upon between the Board of Works and the companies; and that the cost of removing the pipes from any existing street into the subways be defrayed by the Metropolitan Board.

Mr. *Denison.*] Possibly one word, Sir, namely, supervision, may require a little more explanation; we should be glad to have your ideas about that.

Chairman.] It means control.

Mr. *Denison.*] Responsibility; how far does that go?

Chairman.] Upon that we say nothing.

Mr. *Rodwell.*] Those words "no rent payable"—does that mean no payment in the shape of rent; that the companies are to go in without any payment at all?

Chairman.] In the existing subways—those that are scheduled—there is no payment to be made for removing the pipes, nor for using the subways.

Mr. *Jackson.*] It will put them in the same position as if their pipes were not removed.

[Adjourned till To-morrow, at Twelve o'clock.

Thursday, 12*th July* 1867.

MEMBERS PRESENT:

Mr. Bagwell.
Mr. Duff.
Mr. Floyer.
Viscount Galway.
Mr. Grove.
Mr. Jackson.
Mr. Cornwall Legh.
Mr. Paull.
Mr. Tite.

WILLIAM TITE, ESQ., IN THE CHAIR.

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12 July 1867.

Mr. *Rodwell* proposed a manuscript Clause 10*a*, in conformity with the resolution of the Committee, and was heard in support thereof.

Mr. *Denison* objected to the clause, submitting that it did not provide for responsibility on the part of the Board, with regard to the efficiency and freedom from danger of the subways, and proposed a clause in substitution.

Mr. *Rodwell* was heard against the clause.

After considerable discussion—

The Committee-room was cleared.

After some time the Counsel and parties were again called in.

The *Chairman* stated that the Committee wished to secure an efficient state of repair and ventilation, and would consider any words which might be proposed to that effect, if any doubt existed upon the subject.

Mr. *Rodwell* proposed the following clause:—"All pipes placed in the subways shall be maintained by the companies to whom the same belong, under the supervision of an officer appointed by the Board, and the subways shall be maintained by the Board, in an efficient state of ventilation and repair, and free from water, and other obstructions in the way of the companies using the same."

Mr. *Denison* was heard against the clause.

Mr. *Rodwell* was heard in reply.

After considerable discussion—

The Committee-room was cleared.

After some time the Counsel and parties were again called in.

The *Chairman* stated that the Committee had unanimously decided that the Preamble of the Bill was proved; that they would proceed with the clauses in the order in which they occurred in the Bill, and that any objection to an individual clause, or any modification of it, they would discuss when they came to it.

The clauses of the Bill were severally read, and, with amendments agreed to.

The manuscript clauses were read, and, with amendments, agreed to.

The *Chairman* was directed to report the Bill, as amended, to the House.

APPENDIX.

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APPENDIX.

Appendix, No. 1.

Appendix, No. 1

PAPERS handed in by Mr. *Walker*, 27 June 1867.

RETURN showing the External Temperature outside the SUBWAY, and the Internal Temperature of the SUBWAY, from 2 April to 27 June 1867.

DATE.	Hours.		External Temperature.		Internal Temperature.					
					No. 1.		No. 2.		No. 3.	
	A. M.	P. M.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.
2 April 1867 -	9	–	50	54	–	–	45	48	44	46
		6	53	61	–	–	45	48	44	48
3 " " -	9	–	44	54	–	–	45	47	44	47
		6	49	58	–	–	46	47	45	48
4 " " -	9	–	48	56	–	–	47	47	46	47
		6	51	58	–	–	46	48	45	48
5 " " -	9	–	44	55	–	–	46	48	45	48
		6	48	61	–	–	46	48	46	49
6 " " -	9	–	46	57	–	–	46	48	45	48
		6	52	61	–	–	46	48	46	49
7 " " -	9	–	48	60	–	–	47	49	46	49
		6	52	58	–	–	47	49	46	50
8 " " -	9	–	44	54	–	–	47	49	46	48
		6	49	56	–	–	47	49	47	49
9 " " -	9	–	43	54	–	–	47	52	46	49
		6	49	56	–	–	49	53	46	48
10 " " -	9	–	39	53	–	–	47	51	46	48
		6	47	56	–	–	48	49	46	48
11 " " -	9	–	44	53	46	57	47	49	46	48
		6	42	53	46	50	46	48	46	48
12 " " -	9	–	38	46	45	47	47	49	46	48
		6	45	55	45	48	46	47	47	48
13 " " -	9	–	43	52	45	47	47	49	46	48
		6	47	55	45	47	47	48	45	48
14 " " -	9	–	49	53	46	48	47	49	45	48
		6	48	56	46	47	47	49	46	48
15 " " -	9	–	45	52	45	46	47	49	46	48
		6	48	56	45	46	47	48	44	48
16 " " -	9	–	45	53	45	46	47	49	46	48
		6	45	56	45	46	47	49	45	48
17 " " -	9	–	48	55	46	47	47	49	46	48
		6	47	61	46	46	47	49	46	48
18 " " -	9	–	49	59	46	47	47	49	46	48
		6	58	64	46	47	47	49	46	48

Appendix, No. 1.

DATE.	Hours.		External Temperature.		Internal Temperature.					
					No. 1.		No. 2.		No. 3.	
	A. M.	P. M.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.
19 April 1867 -	9	–	53	60	46	47	48	49	47	49
		6	57	65	47	47	48	50	47	49
20 " " -	9	–	54	62	47	48	48	50	47	49
		6	53	61	48	49	49	51	47	49
21 " " -	9	–	41	55	47	48	48	51	48	50
		6	45	53	47	48	49	51	48	50
22 " " -	9	–	42	52	47	48	49	51	48	49
		6	51	60	48	49	49	50	48	49
23 " " -	9	–	50	59	48	49	49	50	48	49
		6	57	64	48	48	49	53	48	50
24 " " -	9	–	49	60	48	48	49	53	48	50
		6	53	62	48	48	49	51	48	50
25 " " -	9	–	48	56	48	49	49	51	48	50
		6	47	52	48	49	49	51	47	50
26 " " -	9	–	42	50	48	48	49	51	48	50
		6	47	54	48	49	49	51	48	50
27 " " -	9	–	46	54	48	49	49	52	48	50
		6	50	60	48	49	49	51	48	51
28 " " -	9	–	40	60	48	48	49	51	48	50
		6	50	63	48	49	49	51	48	50
29 " " -	9	–	41	58	48	48	49	51	48	50
		6	41	61	48	48	49	51	48	50
30 " " -	9	–	45	50	48	48	49	52	48	50
		6	52	62	48	49	50	51	48	50
1 May " -	9	–	45	56	49	49	50	51	48	50
		6	51	61	49	49	50	51	48	50
2 " " -	9	–	45	59	49	49	50	51	48	51
		6	50	60	48	49	50	52	48	50
3 " " -	9	–	48	52	49	50	50	52	48	50
		6	56	63	49	49	50	52	48	51
4 " " -	9	–	50	64	49	50	50	52	49	51
		6	60	69	50	50	50	52	49	51
5 " " -	9	–	49	69	50	50	51	52	49	51
		6	60	73	50	51	51	53	49	51
6 " " -	9	–	54	69	50	51	51	53	50	50
		6	68	83	51	51	51	54	50	51
7 " " -	9	–	62	83	51	51	52	54	50	52
		6	72	83	52	54	53	54	51	53
8 " " -	9	–	54	77	53	54	54	55	52	54
		6	65	81	54	54	54	56	52	54
9 " " -	9	–	54	75	54	55	54	56	52	54
		6	63	75	54	54	54	57	53	54
10 " " -	9	–	58	68	54	55	55	56	54	55
		6	66	81	55	55	55	57	54	55
11 " " -	9	–	57	75	55	56	55	57	54	55
		6	64	71	55	55	56	58	54	55
12 " " -	9	–	52	56	55	55	55	57	54	56
		6	53	60	55	55	55	57	54	56

Appendix, No. 1.

DATE.	Hours.		External Temperature.		Internal Temperature.					
					No. 1.		No. 2.		No. 3.	
	A.M.	P.M.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.
13 May 1867	9	–	46	56	55	53	55	57	54	55
		6	47	54	55	55	55	57	53	55
14 " "	9	–	44	53	56	55	55	57	53	55
		6	46	55	58	58	54	56	53	55
15 " "	9	–	43	50	57	54	54	55	52	54
		6	44	53	53	54	53	55	51	54
16 " "	9	–	50	58	53	53	53	55	51	54
		6	47	55	–	–	52	54	51	54
17 " "	9	–	42	54	–	–	53	54	51	53
		6	47	56	–	–	52	54	51	53
18 " "	9	–	40	56	–	–	52	54	50	53
		6	54	65	51	52	52	54	51	53
19 " "	9	–	46	64	51	52	52	54	51	53
		6	61	70	51	51	52	54	51	53
20 " "	9	–	58	68	51	52	52	54	51	53
		6	54	67	51	52	52	54	50	54
21 " "	9	–	50	59	52	53	52	54	51	53
		6	46	53	52	53	52	54	51	53
22 " "	9	–	37	50	51	53	52	54	51	54
		6	35	51	52	52	52	54	51	54
23 " "	9	–	33	47	51	51	52	54	51	53
		6	34	54	51	51	51	53	50	53
24 " "	9	–	35	50	50	51	51	53	50	52
		6	45	52	50	50	51	53	50	52
25 " "	9	–	37	52	49	50	51	53	50	52
		6	50	56	49	50	51	53	50	52
26 " "	9	–	46	53	49	50	51	53	49	51
		6	52	68	50	50	51	53	50	52
27 " "	9	–	52	69	50	50	51	53	50	52
		6	52	68	50	50	51	53	50	52
28 " "	9	–	43	62	50	50	51	54	50	52
		6	57	71	51	51	51	53	50	52
29 " "	9	–	53	69	51	51	51	53	51	52
		6	64	74	51	52	52	54	51	54
30 " "	9	–	51	70	52	53	52	55	51	54
		6	62	75	51	51	53	55	52	54
31 " "	9	–	50	65	52	54	53	55	52	54
		6	57	74	52	54	54	55	53	54
1 June "	9	–	51	71	53	54	53	55	53	55
		6	67	80	54	55	54	56	53	55
2 " "	9	–	56	75	54	55	54	56	53	55
		6	69	83	50	55	54	57	54	55
3 " "	9	–	54	80	55	55	54	57	54	55
		6	53	63	55	55	54	57	54	55
4 " "	9	–	48	60	55	55	55	58	55	56
		6	56	67	55	55	56	57	50	56
5 " "	9	–	42	65	55	56	55	57	54	56
		6	54	63	55	55	56	58	55	56

Appendix, No. 1.

DATE.	Hours.		External Temperature.		Internal Temperature.					
					No. 1.		No. 2.		No 3.	
	A.M.	P.M.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.
6 June 1867 -	9	–	53	62	55	55	55	57	55	56
		6	59	68	55	55	56	58	48	56
7 ,, ,, -	9	–	51	63	55	55	55	57	53	56
		6	57	68	55	55	55	57	53	56
8 ,, ,, -	9	–	48	62	55	55	55	57	53	56
		6	53	68	55	53	55	57	54	56
9 ,, ,, -	9	–	52	65	55	55	55	57	54	56
		6	60	73	55	55	55	58	55	57
10 ,, ,, -	9	–	52	73	55	55	55	57	54	57
		6	64	83	55	55	56	58	55	57
11 ,, ,, -	9	–	57	81	56	56	56	58	55	57
		6	69	84	56	58	56	59	55	57
12 ,, ,, -	9	–	59	83	57	58	57	59	55	57
		6	91	84	58	58	58	60	56	58
13 ,, ,, -	9	–	52	76	57	59	58	60	56	58
		6	59	69	57	58	58	59	56	58
14 ,, ,, -	9	–	52	65	58	58	58	60	57	58
		6	54	68	58	59	58	60	57	59
15 ,, ,, -	9	–	45	62	57	58	58	60	56	59
		6	54	63	57	58	58	60	56	58
16 ,, ,, -	9	–	47	58	57	58	57	59	56	58
		6	52	60	57	57	57	59	56	58
17 ,, ,, -	9	–	48	58	57	57	57	59	56	58
		6	54	63	56	57	57	58	56	58
18 ,, ,, -	9	–	49	64	56	57	57	59	56	58
		6	61	73	56	56	57	59	55	58
19 ,, ,, -	9	–	58	72	56	57	57	59	56	58
		6	62	72	57	57	57	59	56	58
20 ,, ,, -	9	–	52	66	56	57	57	62	56	58
		6	57	69	56	57	57	59	56	58
21 ,, ,, -	9	–	50	63	56	57	57	59	56	58
		6	56	57	56	57	57	59	56	58
22 ,, ,, -	9	–	45	63	56	57	57	59	56	58
		6	52	70	56	56	57	59	55	57
23 ,, ,, -	9	–	49	67	56	57	57	58	56	58
		6	59	75	56	56	57	58	56	58
24 ,, ,, -	9	–	53	75	56	57	57	59	56	58
		6	59	73	57	57	57	59	56	58
25 ,, ,, -	9	–	49	69	57	57	57	60	56	60
		6	60	74	57	57	58	60	57	60
26 ,, ,, -	9	–	49	72	57	58	57	60	57	60
		6	56	75	57	57	57	60	58	61
27 ,, ,, -	9	–	45	74	57	58	51	61	57	59

Appendix, No. 2.

PAPERS handed in by Mr. *Bazalgette*, 28 June 1867.

Appendix, No. 2.

(A.)—GAS EXPLOSIONS.

Date.	Locality.	Persons Injured.	Page.
7 October - 1831	Crawford-street, Marylebone	Mr. Dowley, the surveyor, severely burnt; for a long time laid in a dangerous state, and his life despaired of. Company afterwards paid his doctor's bill and gave him 100*l.* as compensation.	328
20 December - 1833	King-street, St. James; Compton-street, Dean-street, Rathbone-place.	Facts reported; no account of anyone injured.	328
26 August - 1835	Cross-street, Carnaby Market, St. James.	Edward M'Donald burnt in a severe manner and confined to his bed, suffering from effects of the accident.	329
19 December - 1836	Great Wilde-street, Lincoln's-Inn-Fields.	John Roche burnt severely; sent to Middlesex Hospital.	329
July - - 1823	Mount-street, Grosvenor-square.	Clancy; knocked down; face and eyes very much injured; sent to St. George's Hospital; laid up six weeks.	329
15 July - 1826	Praed-street, Paddington -	Grantham, bricklayer, Dixey, labourer, very much burnt.	329
26 November - -	King-street, Westminster -	Gas issuing from sewer was so strong that it was not safe to enter, and other portions had to be opened which would not otherwise have been disturbed.	329
7 December - 1827	Wood-street, and Little College-street, Westminster.	This explosion first took place in the cellar of No. 3, Little College-street, and communicated with the sewer. The dirt and rubbish accumulated in the gully drains was thrown up into the street as if discharged from a gun.	330
17 February - 1837	George-street, Tottenham Court-road.	Thomas Jones severely burnt; John Collins slightly burnt.	330
20 June - 1837	Windmill-street, Charlotte-street, Rathbone-place.	Henry Floyd, bricklayer, severely burnt, and confined to his bed, suffering from the effects of the accident.	330
17 September 1842	Hay-hill, Berkeley-square -	Richard Cummings and Anthony Craven were severely burnt; Cummings confined to his bed in St. George's Hospital four weeks.	330

Appendix, No. 2.

Date.	Locality.	Persons Injured.	Page.
21 September 1842	Oxford-street - - -	Edward Jordon severely burnt and confined to his bed in Middlesex Hospital 10 days.	331
12 October - 1842	Hay-hill, Berkeley-square -	William Knowles and Charles Woolner severely burnt. Knowles was in St. George's Hospital nearly three months.	331
18 November - 1843	Upper Grosvenor-street -	Bryant Bridd severely burnt in the face and hands and confined to his bed. Owen Carty much burnt about the face and right arm.	331
5 January - 1844	Great Chapel-street - -	John Drewett very much burnt. George Green burnt about the face and hands.	331
27 November 1844	Horseferry-road, Westminster	Edward M'Donald severely burnt	351
6 March - 1846	King-street by Fludyer-street, Westminster.	David Carthy slightly burnt -	332
1 May - 1846	Old Rochester-row - -	Mr. Henry Webber, clerk of works, seriously burnt in the face and hands.	332
17 December - 1851	Cromer-street, King's Cross	Mr. J. Wilkins very seriously burnt, unable to resume his duties for three months.	332
6 June - 1862	Church-street, Shoreditch -	Gas escaped into house and blew it down, and a woman lost her life.	332

GAS EXPLOSIONS.

To the Right Honourable and Honourable the Commissioners of Sewers for Westminster, &c.

Honourable Sirs, 7 October 1831.

I BEG leave to state that Mr. Dowley, the surveyor, is unable to attend this day in consequence of having been severely burnt by an explosion of gas which took place in the sewer in Crawford-street, Marylebone, near to Baker-street, while he was examining the said sewer, on Friday last, about three o'clock in the afternoon.

I have since made a particular examination of the sewer and pipes in Crawford-street and Baker-street, and find that the escape and accumulation of gas in the sewer arose from the imperfect manner in which the workmen employed by the Imperial Gas Company had made and stopped the joints of the main gas-pipe, as shown by the annexed plan, which gas, upon the approach of the candle used in examining the sewer, exploded, and burnt Mr. Dowley in a severe manner, as before stated, he being some distance in advance of myself and others who were assisting him.

(signed) *Merry McKeone,*
Clerk of the Works.

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6 January 1832.

THE surveyor stated, for the information of the Court, that the Imperial Gas Light and Coke Company had made him compensation for the injury he had sustained and the expenses he had incurred in consequence of his having been burned by an explosion of gas in the sewer in Crawford-street, Marylebone, as reported to the Court on the 7th October last.

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20 December 1833.

THE surveyor presented, this day, to the Court, reports of explosions of gas having taken place while works were being carried on in the sewers of the streets and places under-mentioned, viz.:—King-street, St. James'-square; Compton-street and Dean-street, Soho; Rathbone-place, Oxford-street.

26 August 1835.

On Tuesday, the 25th August 1835, while the labourers employed by the contractors to the Commissioners were cleansing the sewer in Cross-street, Carnaby Market, St. James', a violent explosion of gas took place under the manhole in King-street, owing to the defective manner in which the joint of a pipe belonging to the Westminster Gas Company was stopped, and one of the labourers (Edward McDonald) was burnt in a severe manner, and is now confined to his bed, suffering from the effects of the accident.

Francis H. Echalaz,
Clerk of the Works.

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19 December 1836.

On Monday, the 19th December 1836, while the workmen in the employ of Messrs. Bird, the contractor to the Commissioners, were cleansing the sewer at the south end of Great Wylde-street, by Duke-street, Lincoln's-inn Fields, a violent explosion of gas took place under the manhole in Duke-street, owing to some defect in the pipes belonging to the proprietors of the Equitable or the Chartered Gas Light and Coke Works, and John Roach, one of the labourers, was burnt severely, and is now confined to his bed in the Middlesex Hospital, suffering from the effects of the accident.

Wm. Aslat,
Clerk of the Works.

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22 December 1836.

Having examined the ground, near the manhole, where the accident occurred, to discover its cause, I find it to proceed from a broken gas pipe, five inches in diameter, belonging to the proprietors of the Chartered Gas Light and Coke Works, Brick-lane, Whitechapel.

Wm. Aslat.

Extract from Court Minutes, Westminster Commission of Sewers, 3rd November 1826.

Sewers Office for Westminster, &c.,
3 November 1826.

I beg leave to report, for the information of the Court, some cases in which workmen employed upon the sewers have been injured by the explosion of gas within the arched sewers.

In the month of July 1823, it being necessary to examine the sewer in Mount-street, Grosvenor-square, near to South Audley-street, a labourer, named Clancey, went in, and when he had proceeded with a lighted candle a short distance from the place where he entered the sewer, an explosion of gas took place, by which the man was knocked down, and his face and eyes so injured as to require his being taken to Saint George's Hospital, and he remained unable to resume his work for the space of six weeks. The gas supplied in the parish was from the works in Peter-street, Westminster. The arch of the sewer had fallen in, and the gas pipe was found to be broken.

On the 15th July last, a further accident took place in Praed-street, Paddington. A bricklayer and labourer, named Grantham and Dixey, were proceeding along the sewer for the examination of a drain, and when they had reached the upright shaft the gas which had collected therein ignited and knocked down the bricklayer, and burnt his head so much that he remained under the care of a surgeon for about a week; the labourer was not so much hurt, being further distant from the shaft. The gas for this street was supplied by the Imperial Gas Light and Coke Company.

Recently, upon opening the sewer in King-street, Westminster, the smell of the gas issuing from the sewer was so strong that it was not considered safe to go into it, and it became necessary to open the sewer in other parts, which would not otherwise have been disturbed.

This circumstance is not uncommon; but until lately, since the second accident, little attention has been paid to it.

A quantity of water occasionally accumulates in the gas pipes; to receive this water iron tanks are placed under the pipes, and from these tanks it is pumped out, and is professed to be taken away in buckets; but this work being frequently done at night it has not been ascertained at all times where the water, if so carried away, has been got rid of. It appears, however, that it is not always conveyed away, because, in the New-road, Marylebone, it was seen by one of the officers that the water was pumped on the surface of the road, and left to find its way into the sewer.

(signed) *John Dowley,* Surveyor.

Appendix, No. 2.

The Surveyor presented to the Court a Report as follows, viz.:—

7 December 1827.

An explosion of gas having taken place in the public sewer in Wood-street and Little College-street, Westminster, on the evening of Tuesday the 27th ultimo, I beg leave to state to the Court that I caused the sewer to be examined, when it appeared that the explosion had been occasioned by the gas pipe belonging to the Westminster Company being broken where it passed near to the shaft, or manhole, over the intersection of the Wood-street and Little College-street sewers.

The said pipe has since been repaired by the Westminster Gas Light Company.

The gas which escaped in consequence of the fracture in the gas pipe at the place above described, found its way into the sewer in Little College-street, and passed up the private drains from the houses which discharge into the said sewer.

I have also to state for the information of the Court, that, upon inquiry made on the spot after the occurrence, it was stated by Mr. David Young, of No. 3, Little College-street, that the explosion first took place within his premises, and the description he gave of it was, that having gone into the cellar under his house in Little College-street, between six and seven o'clock in the evening of the 27th ultimo, he was returning up the steps into the yard, when, having a lighted candle with him, it set fire to the gas in the cellar, which gas had penetrated through the wall from a drain under the yard, which passed along the back of his house. This ignition of the gas in the cellar communicated through the wall to the gas in the drain, and caused another explosion in the privy above ground at the back of the yard, and was heard to pass along the drain, through the house, into the street; quickly succeeding this explosion a loud report was heard, proceeding apparently from the common sewer, when at the same time the dirt and rubbish accumulated in the gully drains was thrown up into the street, as if discharged from a gun.

The sewer itself does not appear to have sustained any injury.

(signed) *John Dowley*, Surveyor.

On Friday, the 17th February 1837, while the workmen in the employ of Messrs. Bennett and Hunt, the contractors to the Commissioners, were cleansing the sewer in George-street, Tottenham Court-road, by Little Charlotte-street, a violent explosion of gas took place in consequence of the escape of gas from a broken gas pipe belonging to the proprietors of the Imperial Gas Light and Coke Works, and Thomas Jones, a labourer employed in cleansing was severely burnt thereby; another explosion took place in the same place, on Tuesday, the 21st February 1837, and John Collins, a labourer employed in cleansing, was slightly burnt thereby.

(signed) *Wm. Aslat*, Clerk of the Works.

On Tuesday, 20th June 1837, while the workmen in the employ of Messrs. Bennett and Hunt were repairing the brickwork of the sewer in Windmill-street, St. Pancras, a violent explosion of gas took place near to John-street, in consequence of an escape of gas from the main gas pipe belonging to the proprietors of the Equitable Gas Light and Coke Works, and Henry Floyd, a bricklayer, was severely burnt thereby, and now is confined to his bed suffering from the effects of the accident.

(signed) *Wm. Aslat*, Clerk of the Works.

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7 October 1842.

On Saturday, the 17th of September 1842, while the workmen in the employ of Messrs. Bennett, contractors to the Commissioners, were examining the sewer at the bottom of Hay Hill, a violent explosion of gas took place under the manhole in consequence of an escape of gas from the pipes belonging to the Chartered Gas Light and Coke Works, and Richard Cummings and Anthony Craven, two of the labourers, were severely burnt, and Cummings now is confined to his bed in St. George's Hospital.

In hospital four weeks. (signed) *W. Jenkins*, Clerk of the Works.

Appendix, No. 2.

7 October 1842.

On Wednesday, the 21st of September 1842, while the workmen in the employ of Messrs. Bennetts, contractors to the Commissioners, were examining the sewer in Oxford-street, a violent explosion of gas took place under the manhole by Turk's Head-yard, in consequence of an escape of gas into the sewer, and Edward Jordan, one of the labourers, was severely burnt, and confined in Middlesex Hospital for 10 days.

In hospital 10 days. (signed) *W. Jenkins*, Clerk of the Works.

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21 October 1842.

On Wednesday, the 12th October 1842, while the workmen in the employ of Messrs. Bennett, contractors to the Commissioners, were examining the sewer at Hay-hill, Berkeley-square, a violent explosion of gas and foul air took place, and William Knowles and Charles Woollener, two ground men, were severely burnt; Knowles is still confined to bed in St. George's Hospital, Woollener was discharged from the said hospital next day. (The gas pipes belong to the Chartered Gas Company).

(signed) *W. Jenkins*, Clerk of the Works.

The above-named William Knowles was discharged from the hospital on Wednesday, 4th January 1843.

(signed) *W. Jenkins.*

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15 December 1843.

The surveyors having presented the book of informations, reported that as Bryant Budd, the labourer in trust, was examining the sewer in Upper Grosvenor-street on Saturday the 18th of November last, an explosion of gas took place at the manhole at the crossing of Upper Grosvenor-street and Park-street, by which he was much burnt in the face and hands, and has since been confined to his bed; also that Owen Carty, a labourer who accompanied Bryant Budd, was also much burnt about the face and right rm. The surveyors also reported that the gas pipe which was laid directly over the manhole belongs to the Chartered Gas Company.

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5 January 1844.

The surveyors having presented the book of informations, reported that as John Drewett and George Green, two ground men, in the employment of Messrs. Bennett, contractors, were on 15th December last removing a dam from the sewer in Great Chapel-street, Westminster, a violent explosion of gas took place, and John Drewett was very much burnt and unable to resume his work; George Green was also burnt about the face and hands, but was enabled to continue his work; also, that the gas pipes in the street belonged to the Chartered, Equitable, and London Gas Companies.

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20 December 1844.

The surveyors presented the book of informations, and reported that on Wednesday the 27th November 1844, whilst the workmen in the employ of Mr. Jay, the contractor, were clearing out rubbish from the sewer in the Horseferry-road, a violent explosion of gas took place under the manhole by New Peter-street, Stratton-ground, in consequence of an escape of gas into the sewer, and that Edward Macdonald, one of the labourers, was severely burnt.

Appendix, No. 2.

6 March 1846.

THE surveyors presented the book of informations, and reported that on Tuesday the 17th February an explosion took place in the sewer in King-street, Westminster, by Fludyer-street, in consequence of an escape of gas, and that David Carthy, a labourer, was slightly burnt.

The Surveyor presented a Report as follows:

"1 May 1846.

"I have to report that Mr. H. Webber, Clerk of Works, was very seriously burnt in the face and hands by an explosion of gas on 27th of last month, while examining a new sewer recently built by the trustees of Tothill-fields, in Old Rochester-row, Westminster.

(signed) "*John Phillips,* Surveyor."

COURT PAPERS, 17 December 1851.

GAS EXPLOSION.

MR. J. WILKINS met with an accident whilst in the act of examining a breach in the Cromer-street sewer, King's Cross, on the 10th January 1850, by which he was blown across the sewer and much injured. His face and hands were black and calcined by the explosion, and did not resume his duties until 4th March following.

BOARD, 6 June 1862.

Read a report as follows—

Middle Level Sewer, Church-street, Shoreditch.

Engineer's Department, Spring Gardens, S.W.,
5 June 1862.

PURSUANT to the resolution of the Main Drainage Committee that I should report to them upon the recent gas accident in connection with the middle level sewer works in Church-street, Shoreditch, I beg to report that at about half-past five o'clock on Wednesday afternoon, the 28th of May last, the foot-pavement opposite to No. 151, Church-street, Bethnal-green, gave way, Messrs. Brassey & Co.'s works being in progress at the time in that locality, and the cutting for the trench having been sunk to a depth of 10 feet. The consequence was, that the gas pipe under the kerbstone was broken, the gas escaped into the house, and an explosion took place. The house fell, and a woman passing at the time lost her life. The cause of the accident is now under investigation before the coroner and a jury, and after they have come to a decision, I shall be able to report the result to the Board.

(signed) *J. W. Bazalgette,* Engineer.

To the Main Drainage Committee.

(B.)

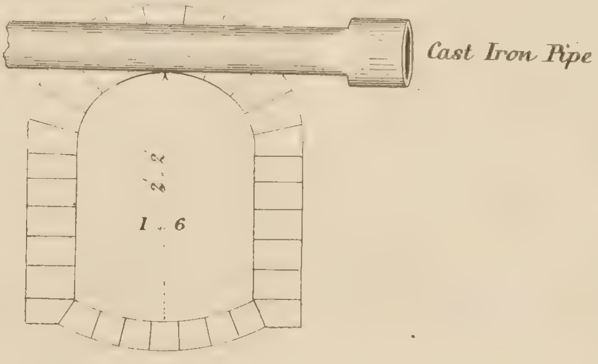
GAS and WATER MAINS and PIPES laid through SEWERS, &c.

Date.	Locality.	Nature of Interference with Sewers, &c.	Page.
21 May 1811 -	Wimpole street, near Henrietta-street, David-street, York-place, and Tottenham Court-road, near Goodge-street.	Drain cut through, leading from the Grates to sewer, by West Middlesex Water Company.	335
14 June 1811 -	Durham-yard, Bow-street, Covent Garden, opposite Hart-street.	Arch of sewer cut through by Water Company.	335
6 July 1811 -	335, Oxford-street - -	Gully cut through by West Middlesex Water Company.	336
6 November 1811	West side of York-place, Portman-square.	Cut away the arches of two gullies and stone pipes laid 4 inches below the underside of the arches.	336
9 October 1812 -	Phillimore-place, Kensington, opposite new road leading to Camden-hill.	Arch of sewer cut through by West Middlesex Water Company.	336
2 July 1818 -	Earl's Court-lane, Kensington.	Iron pipe laid across open sewer near bottom of watercourse.	337
2 August 1819 -	Strutton Ground, Westminster.	Gully drain cut through by Gas Company.	337
4 May 1821 -	South side of High-street, Kensington, opposite Church-street.	Gully drain cut away by Gas Company, and an iron pipe laid through the same.	338
3 July 1823 -	King's Scholar's Pond sewer, New road. York-place, Nottingham-place, Winchester-row.	Sewer cut through by Imperial Gas Company, and iron pipe laid across same. Gully drains cut through.	338
1 October 1824 -	Thazer-street; opposite No. 8, Oxford-street; opposite No. 108, Mortimer-street; corner of Regent-street.	Gas pipes laid through gully drains by Imperial Gas Company.	339
21 October 1824 -	York-street; opposite 51, Little George-street; opposite No. 20, Romer-street; opposite No. 38, Bryanstone-mews, South Montague-square; opposite No. 1.	Gas pipes laid through gully drains by Imperial Gas Company.	340
26 October 1826 -	Upper Eaton-street, Pimlico	Part of arch of sewer cut away to lay 27-inch main Grand Junction Water Company.	341

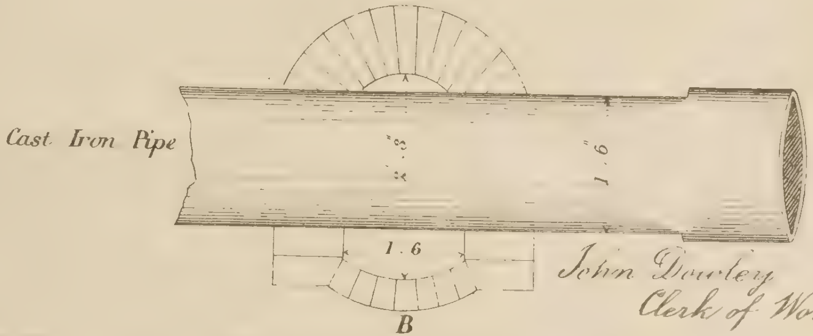
Date.	Locality.	Nature of Interference with Sewers, &c.	Page.
18 December 1826	Park-lane, St. George's, by South-street, and Sidney-street.	Six-inch cast iron gas pipes laid through two gully drains by Westminster Gas Light and Coke Company.	341
23 December 1826	Park-lane, near Sidney-street.	Gas pipe raised to level of soffit of arch.	341
9 March 1830 -	King's Scholars Pond main sewer in Pimlico-road.	About 9 inches of arch cut away, and iron pipe laid through arch.	342
31 October 1831 -	York-street, Westminster, opposite Coach and Horses public-house.	Six-inch iron pipe laid under gully drain by Equitable Gas Company.	342
3 November 1831	Cross-street, Carnaby Market, by King-street.	Iron pipe laid through arch of gully drain by Chartered Gas Company.	342
16 December 1831	Edward-street, by Broad-street, St. James'.	Brick work of gully cut away by Westminster Gas Light Company.	343
3 February 1834	Tothill-street, Westminster -	Nine-inch gas main and six-inch water pipe laid through gully.	344
17 February 1834	West side of Carnaby-street, by Carnaby Market.	Eight-inch gas pipe laid through gully drain by Chartered Gas Company.	344
15 March 1834 -	Wood-street, Marlborough-road, Chelsea.	Six-inch iron pipe laid over shaft sewer.	345
1 May 1834 -	Princes-street, Leicester-square.	Nine-inch gas pipe through gully drain.	345
1 May 1834 -	St. Martin's-place - -	Three-inch gas pipe over shaft or manhole.	346
21 September 1837	St. John's Wood-road - -	Fixed a gas lamp-post in a gully drain.	346
7 April 1843 -	Great Peter-street, Westminster.	Six-inch gas main through the manhole over sewer.	346
1 June 1860 -	Wood-street, Westminster -	Gas main through the crown of sewer.	347
26 October 1860 -	Cockspur-street - - -	Twenty-four-inch gas main through the manhole of main sewer.	347
24 November 1865	Southwark street - -	Water mains being laid by breaking up new paving of street, and laying pipes through side entrance to subway.	347
24 November 1865	Southwark-street - -	Twelve-inch gas main - -	347

21st May, 1811.

The Workmen employed by the West Middlesex Water Works Company have cut through the drains leading from the Grates into the Common Sewers in Wimpole Street, near Henrietta Street, and in David Street, York Place as shewn by the Section marked A. Also in Tottenham Court Road near Goodge Street as shewn by Section marked B for the purpose of laying down their Cast iron pipes.



A

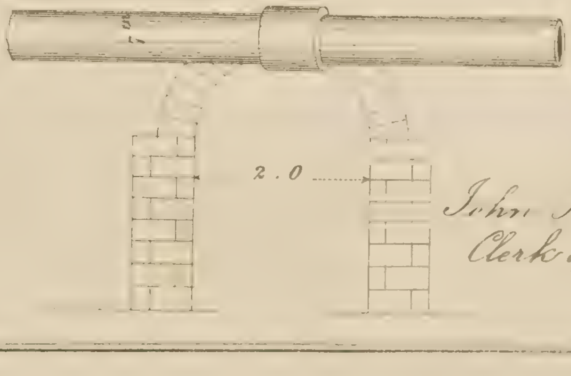


B

John Dowley
Clerk of Works.

14th June 1811.

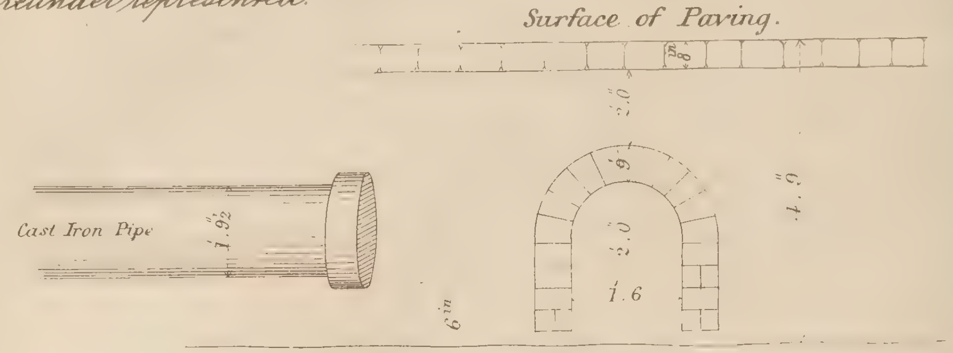
The Workmen employed by the York Building Water Works Company have cut through the Arch of Durham Yard Main Sewer in Bow Street Covent Garden, opposite the end of Hart Street, for the purpose of laying down their cast iron pipes.



John Hill,
Clerk of Works.

6th July 1811.

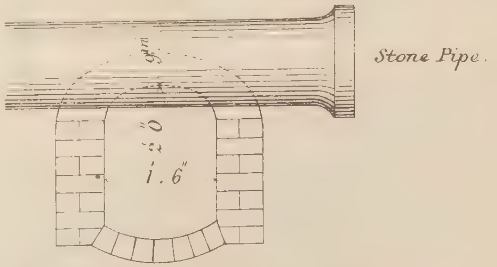
The Workmen employed by the West Middlesex Water Works Company have cut through the drain from Gully in front of No 335, Oxford Street, for the purpose of laying down their Cast iron pipes as hereunder represented.



John Dowley,
Clerk of the Works.

6th November, 1811.

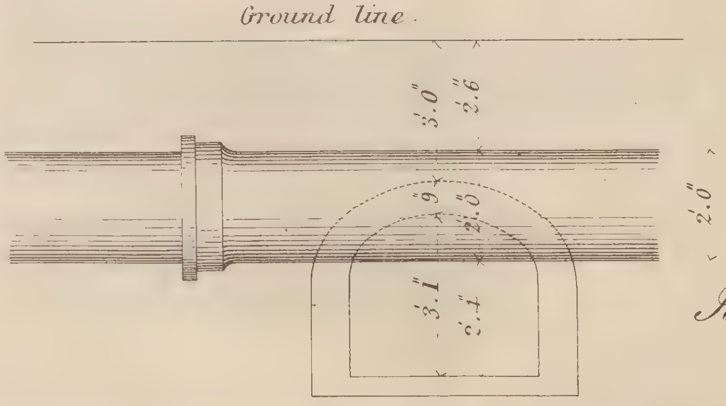
The Workmen employed by the Grand Junction Water Works Company have without permission from the Honble the Commissioners of Sewers for Westminster, &c, cut away the arches of two drains leading from two gullys on the West side of York Place Portman Square, and laid their Stone pipes across the said Drains.— The pipes being 4 in. below the underside of the arches of the said Drains as shewn by Sketch.



John Dowley,
Clerk of the Works.

9th October 1812.

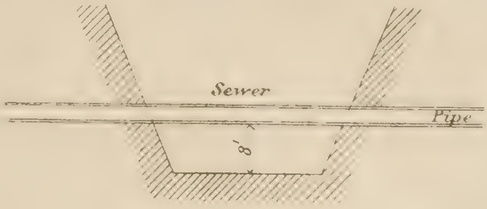
The Workmen employed by the West Middlesex Water Works Company have cut through the arch of the Sewer in front of Phillimore Place, Kensington, opposite the end of the new road leading to Camden Hill and laid an iron pipe through the same with permission from this Court.



John Hill,
Clerk of the Works,
Southern District.

2nd July 1818.

The Workmen employed by the West Middlesex Water Works Company have laid an iron pipe across the open Sewer on the East side of Earl's Court Lane Kensington so near to the bottom of the Water Course as to leave only 8 inches water way under the said pipe (see Sketch).

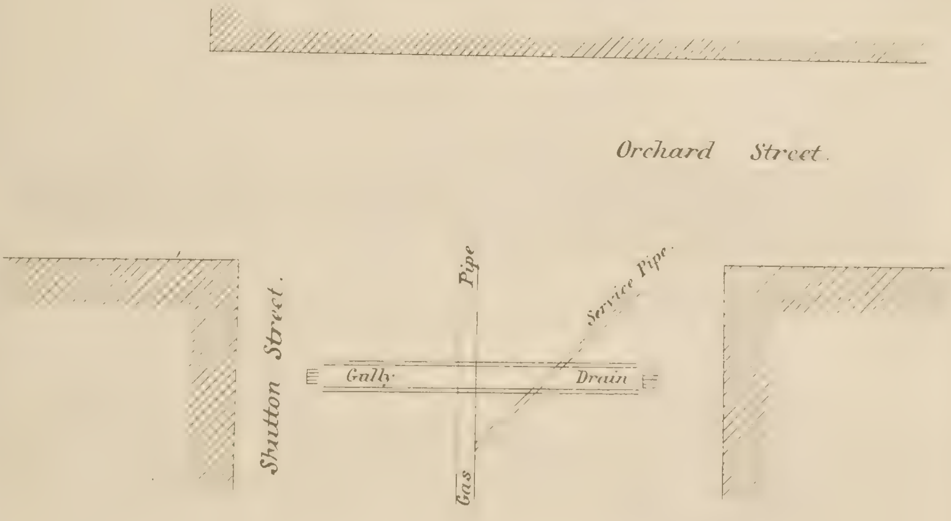


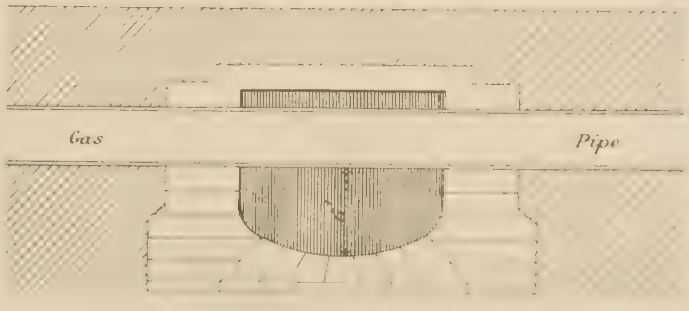
John Provis,
Third Clerk of the Works.

2nd August 1819.

The Gas Company have cut through a Gully drain & laid their Main through the same in Sutton Ground Westminster without leave of the Commissioners of Sewers for Westminster, &c.

Thomas Barton
First Clerk of the Works.





Section.

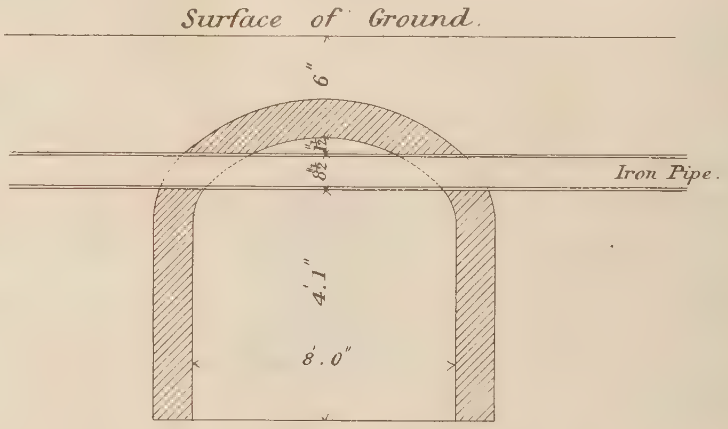
4th May, 1821.

The Workmen employed by the Brentford Gas Light Company have cut away part of a Gully and have laid an iron pipe through the same on the South side of High Street, Kensington, opposite Church Street, without leave from the Commissioners of Sewers for Westminster.

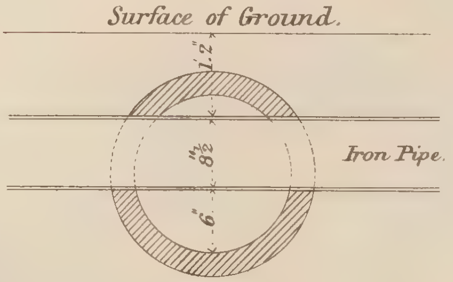
George Cooper,
Second Clerk of the Works.

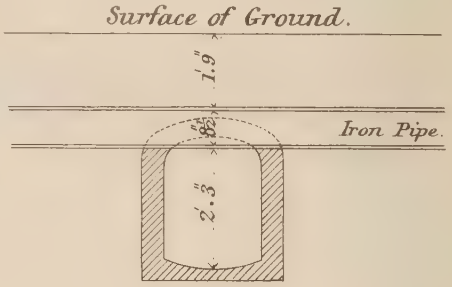
3rd July 1823.

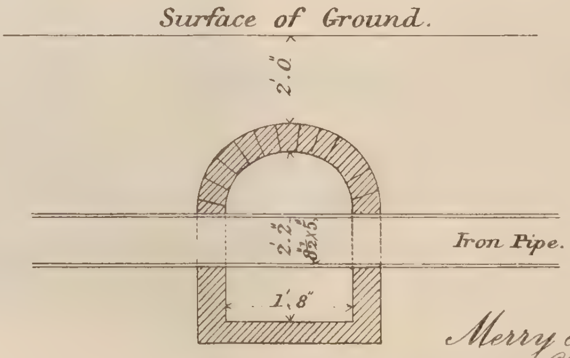
The Workmen employed by the Imperial Gas Company have without leave of this Court cut through the King's Scholars Pond Main Sewer where it crosses the New Road and laid a cast iron pipe through the same as per Sketch.



Also through several gully drains in the New Road near York Place as sketch marked A. — near Nottingham Place as marked B. — and Winchester Row as marked C.





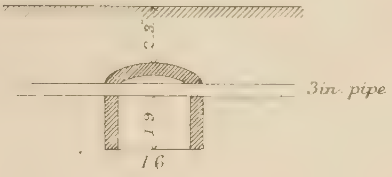


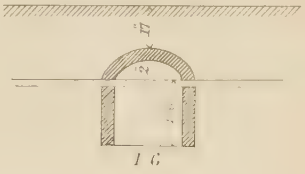
Merry M. Keone.
Clerk of the Works.

1st October 1824.

Griffiths of N^{o} 13 City Basin Contractor to the Imperial Gas Company has without leave of this Court laid Gas pipes through the Gully drains in the following Streets as under described:-

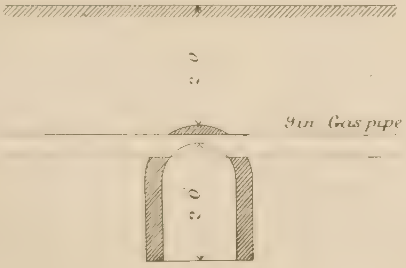
Thayer Street opp^{e} N^{o} 8.



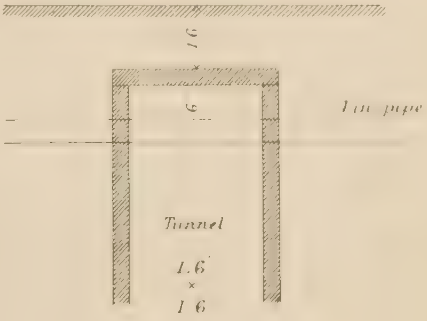


Also — - M^{c} Intosh another of the Contractors to the Imperial Gas Company has laid Gas pipes through the Gully drains in the two following places.

Oxford Street
opposite N^{o} 108.



Mortimer Street
corner Regent Street.

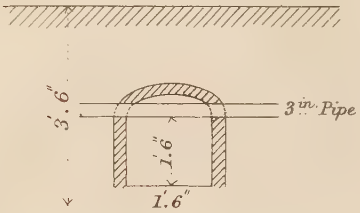


Merry M. Keone,
Clerk of the Works.

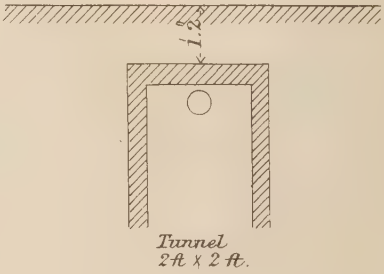
21st October, 1824

– Anderton, of Ivy Cottage, Kentish Town, Contractor, to the Imperial Gas Company has without leave of this Court laid Gas pipes through the Gully drains in the following Streets as under described:–

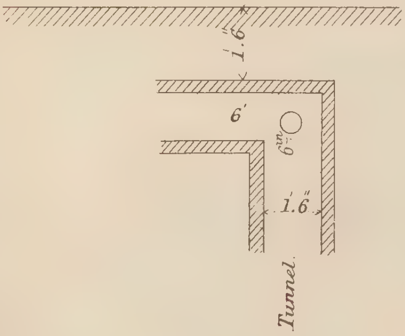
York Street.
Oppe. No. 51.



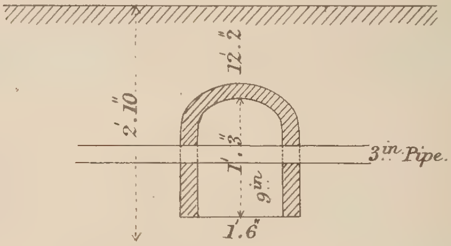
Little George Street.
Oppe. No. 20.



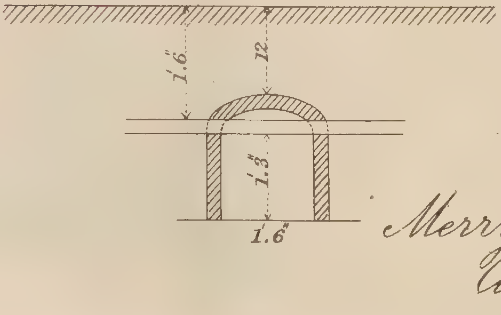
Romer Street, No. 38.



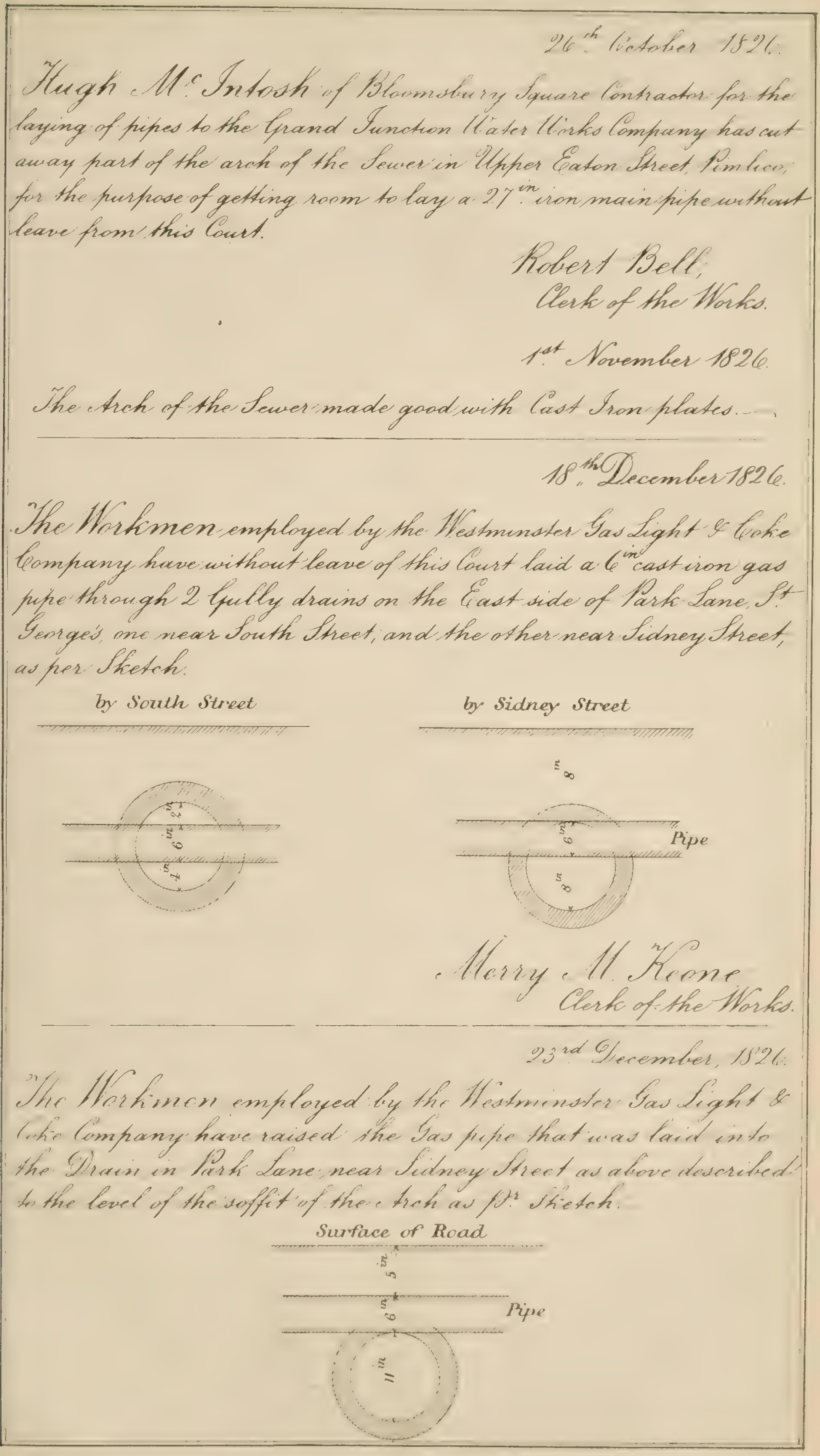
Bryanstone Mews South.
Oppe. No. 15.



Montague Square, Oppe. No. 1.



Merry M. Keone,
Clerk of the Works.



26th. October 1826.

Hugh Mc. Intosh of Bloomsbury Square Contractor for the laying of pipes to the Grand Junction Water Works Company has cut away part of the arch of the Sewer in Upper Eaton Street, Pimlico, for the purpose of getting room to lay a 27in. iron main pipe without leave from this Court.

Robert Bell;
Clerk of the Works.

1st. November 1826.

The Arch of the Sewer made good with Cast Iron plates.

18th. December 1826.

The Workmen employed by the Westminster Gas Light & Coke Company have without leave of this Court laid a 6in cast iron gas pipe through 2 Gully drains on the East side of Park Lane, St. George's, one near South Street, and the other near Sidney Street, as per Sketch.

Merry Mc Keone
Clerk of the Works.

23rd December, 1826.

The Workmen employed by the Westminster Gas Light & Coke Company have raised the Gas pipe that was laid into the Drain in Park Lane, near Sidney Street as above described to the level of the soffit of the Arch as pr. Sketch.

9th March 1830.

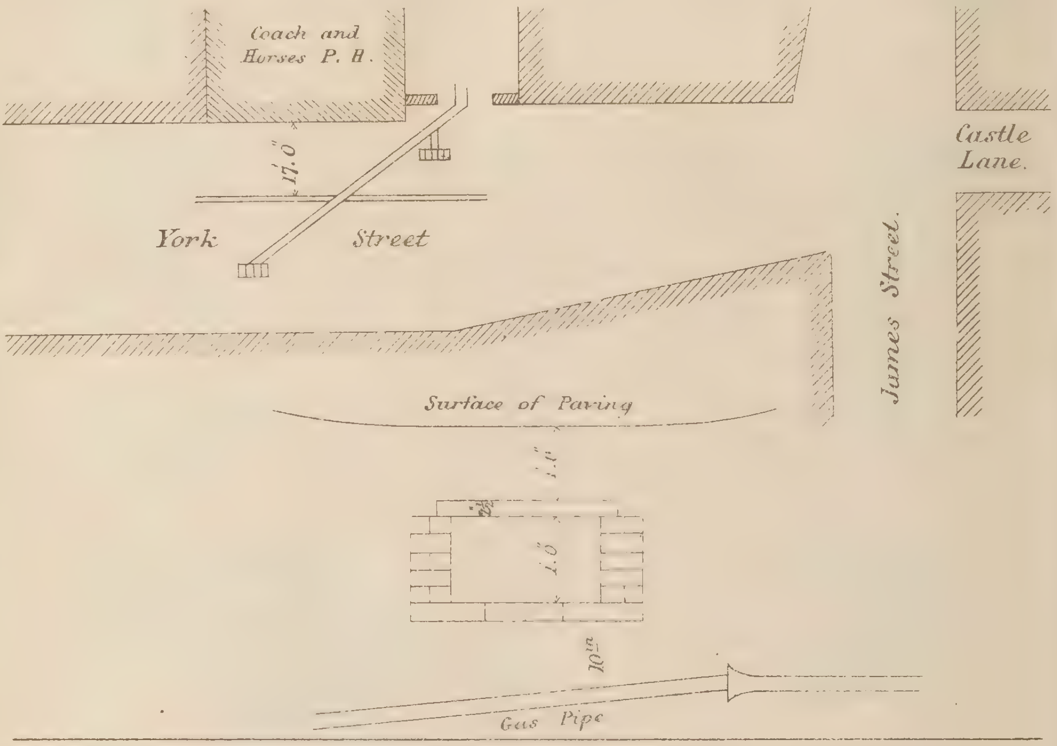
The Workmen employed by the Westminster Gas Company have cut away about nine inches of the Arch of the King's Scholars Pond Main Sewer in the Pimlico Road at the end of Imes Street, and have laid an iron pipe through the said arch without leave from this Court

Bryant Budd

31st October, 1831.

The Workmen employed by the Equitable Gas Light Company & have laid a 6in iron pipe under the Gully drain in York Street, Westminster opposite the Coach & Horses Public House without leave from this Court as pr Sketch.

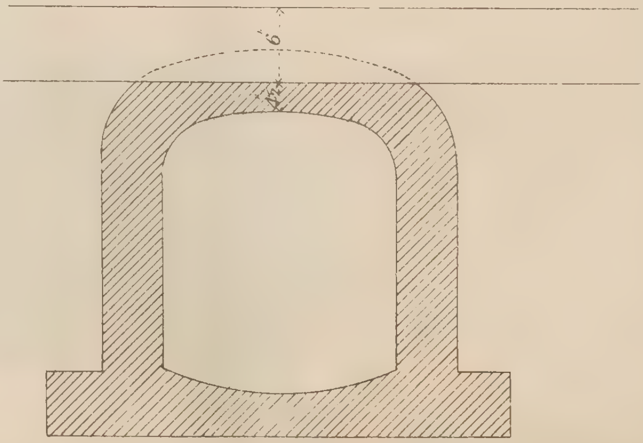
Robert Bell,
Clerk of the Works.



3rd November, 1831.

The Workmen employed by the Westminster Chartered Gas Light Compy. have laid an iron pipe through the arch of the Gully drain situate in Cross Street, Carnaby Market by King Street.

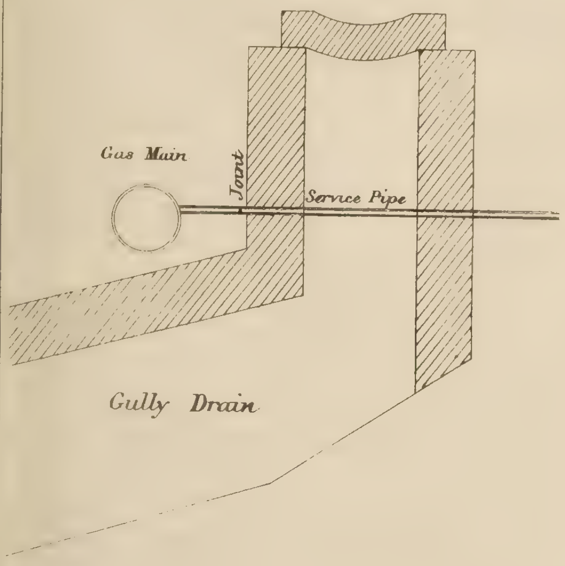
Robt Hemberow.



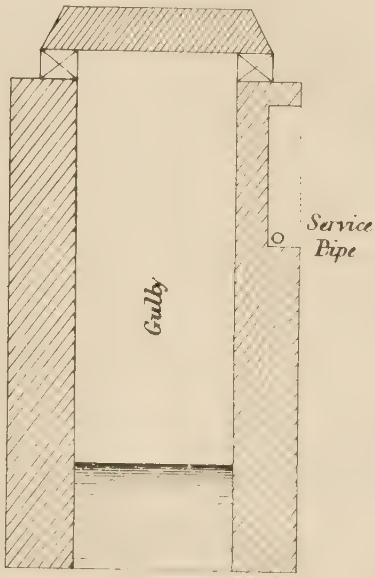
16th December, 1831.

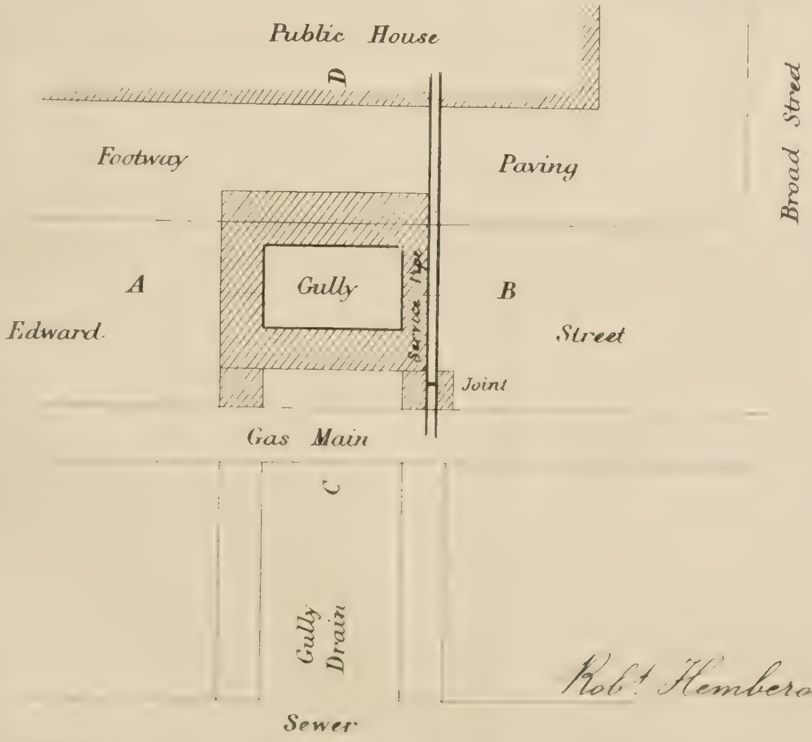
The Workmen employed by Mr Gage a Contractor to the Westminster Gas Light & Coke Company have cut away the Brickwork of the Gully in Edward Street, by Broad Street St James's for the purpose of laying on a Service pipe to the Blue Posts Public House without leave of this Court as shewn on Sketch.

Section of Gully from C to D.



Section of Gully from A to B.





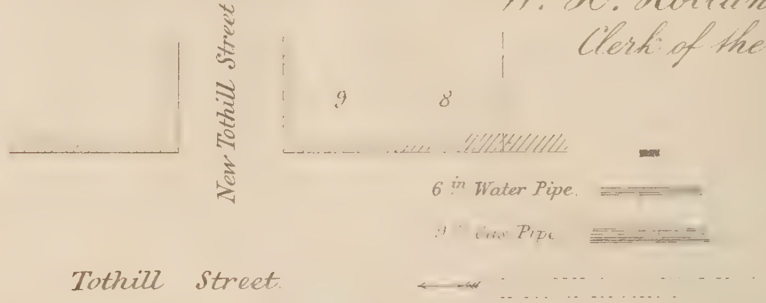
Robt. Hemberow

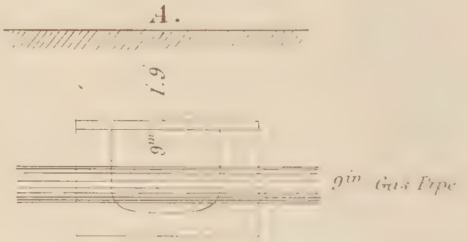
3rd February, 1834.

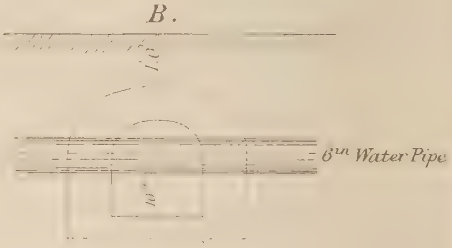
The Workmen employed by the Westminster Gas Company have laid a 9^{in} main pipe through a Gully drain on the South side of Tothill Street Westminster, opposite the second house West from New Tothill Street, as shewn by Section A.

The Workmen employed by the Chelsea Water Works Company have laid a 6^{in} Water pipe through the same Gully drain as shewn by Section B.

W. H. Holland.
Clerk of the Works.

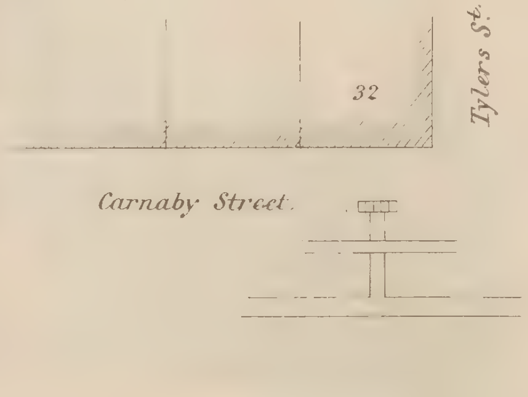


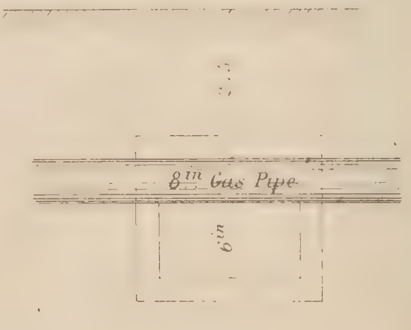




17th February, 1834.

The Workmen employed by the Westminster Chartered Gas Company have laid an 8^{in} gas pipe through the Gully drain on the West side of Carnaby Street Carnaby Market, opposite the 1st house South from Tylers Street as shewn by Section.





Francis N. Eschalaz.
Clerk of the Works.

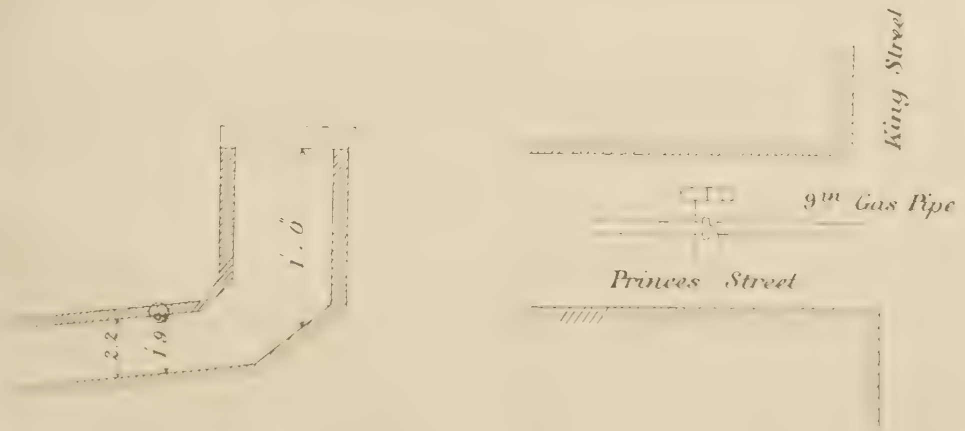
15th March, 1834.

The Workmen employed by the Chelsea Water Works Company have laid a 6in iron pipe over the Shaft of a Sewer in Wood Street Marlborough Road, Chelsea.— The pipe rests upon the plates and renders the Shaft useless.

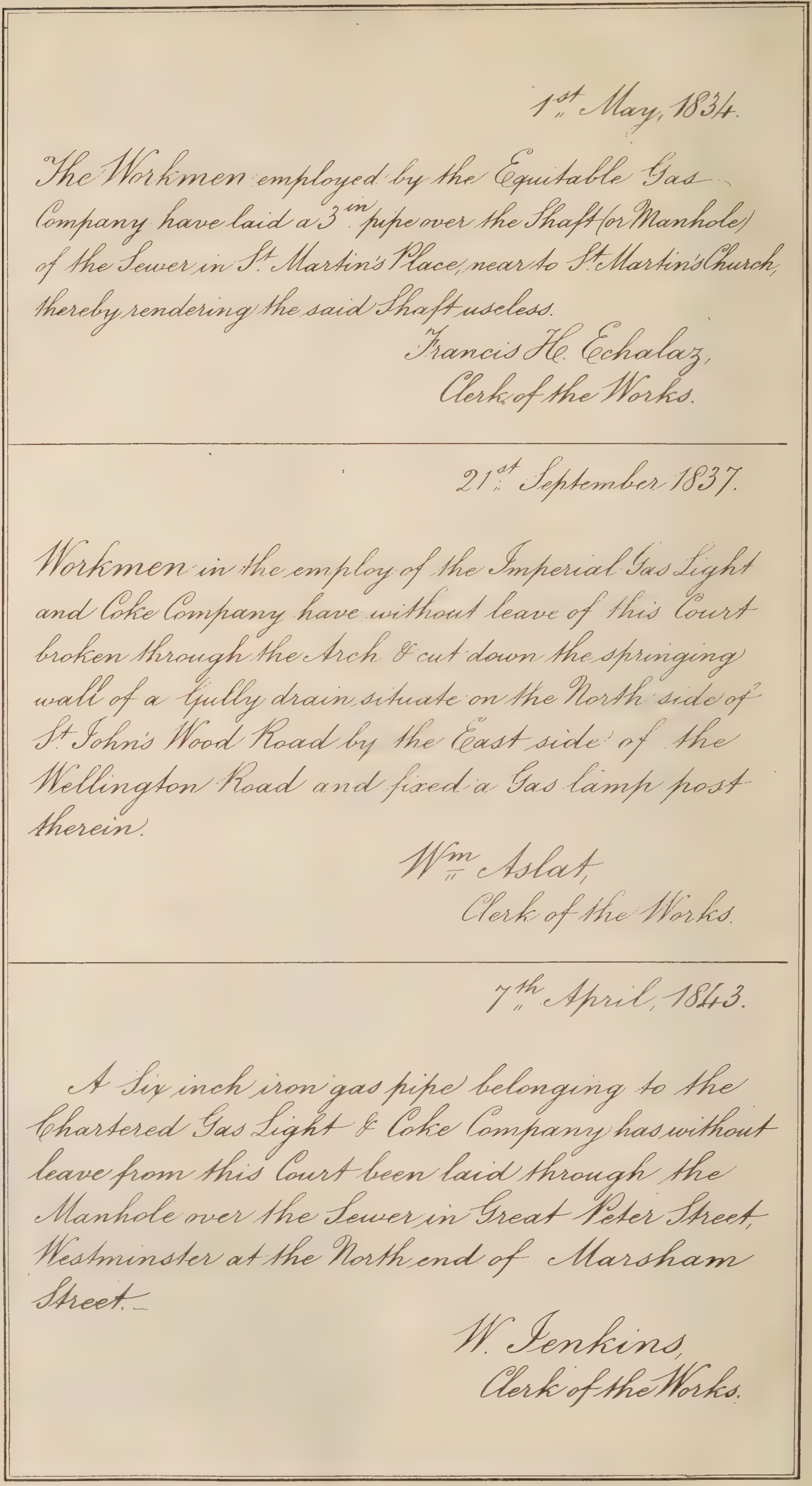
W. H. Holland,
Clerk of the Works.

1st May, 1834.

The Workmen employed by the Equitable Gas Company have laid a 9in main pipe through a gully drain on the East side of Princes Street, Leicester Square, being opposite the 1st house North from King Street, as shewn pr sketch under:—



Francis H. Echalaz.
Clerk of the Works.



1st May, 1834.

The Workmen employed by the Equitable Gas Company have laid a 3in. pipe over the Shaft (or Manhole) of the Sewer in St. Martin's Place, near to St. Martin's Church, thereby rendering the said Shaft useless.

Francis H. Echalaz,
Clerk of the Works.

21st. September 1837.

Workmen in the employ of the Imperial Gas Light and Coke Company have without leave of this Court broken through the Arch & cut down the springing wall of a Gully drain situate on the North side of St. John's Wood Road by the East side of the Wellington Road and fixed a Gas lamp post therein.

Wm. Aslat,
Clerk of the Works.

7th. April, 1843.

A Six inch iron gas pipe belonging to the Chartered Gas Light & Coke Company has without leave from this Court been laid through the Manhole over the Sewer in Great Peter Street, Westminster at the North end of Marsham Street.

W. Jenkins,
Clerk of the Works.

Board, 1 June 1860.

Read a Report by the Engineer, dated 1st June 1860, on the application of the Chartered Gas Company for permission to lay their gas main through the crown of the Wood-street Main Sewer, in Great Peter-street, Westminster.

It was moved by Mr. Crellin, seconded by Mr. D'Iffanger, and

Resolved—That the Report be approved, and that permission be given to the Chartered Gas Company, to lay their iron gas main through the crown of the Wood-street main sewer, in Great Peter-street, Westminster, as shown on the drawing now produced, provided the company cover their main for a length of 10 feet with iron covering, half-inch thick, lined with one and a half inch of hemp and tar packing; such works being done under the superintendence and to the satisfaction of the officers of the Board.

Board, 26 October 1860.

Read a Report by the Engineer, dated 25th October 1860, on the application from the Chartered Gas Company for permission to lay a 24-inch gas main through the manhole of the Regent-street Main Sewer in Cockspur-street, Charing Cross.

It was moved by Mr. Crellin, seconded, and

Resolved—That the Report be approved, and that the application be granted, on condition that the gas main be carried through the manhole in half-inch iron covering, lined with one and a half inches of hemp and tar packing, and laid upon York landing, such work being executed to the satisfaction of the officers of the Board.

Board, 24 November 1865.

Mr. Collinson having called the attention of the Board to the fact that the Southwark and Vauxhall Water Company were taking up the pavement in Southwark-street, for the purpose of laying down their mains, and were injuring the brickwork of the side entrance to theBoard's subway,

It was moved by Mr. Collinson, seconded by Mr. Hall, and

Resolved—That it be referred to the engineer and solicitor, to advise the Board as to what steps are necessary to be taken for the purpose of preventing any interference with the property of the Board in the new street, and for protecting their interests.

Board, 1 December 1865.

Read the following Reports by the Engineer and Solicitor, prepared pursuant to the Resolution of the Board of the 24th ultimo (No. 4).

Southwark Street.

Engineer's Department, Spring Gardens, S. W.
29 November 1865.

With reference to the statement made at the meeting of this Board on Friday last, that certain companies, in laying their pipes in Southwark-street, had interfered with the brickwork of some of the side entrances to the subway, I beg to report that I have caused an inquiry to be made into this matter, with the following result:—

Messrs. Aird, the contractors, have laid three iron pipes in a trench, eight feet wide, the nearer edge of it being about three feet from the curb. Two of these pipes, namely, a seven-inch main, and a four-inch service, have been laid about a foot apart, from High-street to a point west of the Southwark Bridge-road; these are for the Southwark and Vauxhall Water Company. From Southwark-square, westwards, a 12-inch gas main is laid for the Phœnix Gas Company.

The two water pipes are the deepest, and in crossing three side entrances the arches have been cut through. The arch of the first, nearest High-street, has been very indifferently made good, but the pipes do not show on the under side of the arch. In crossing the arch of the second, the brickwork has been entirely cut through, and one pipe protrudes from one to two inches from the under side. In the third, the same thing occurs, namely, one pipe shows on the under side, and the brickwork has been very clumsily repaired. The water pipes have been kept deeper than the gas main in order to keep the water cool, and the latter, though the largest pipe, does not protrude under the arches of the side entrances.

I understand that three pipes are to be laid on the north side of the street, so that fully one-third of the carriage way will thus have been disturbed, and the concrete arched foundations broken through, thereby ruining the paving, which will not now last a fourth of the time it would, if it had not been disturbed.

(signed) *J. W. Bazalgette*, Engineer.

Board, 1 December 1865.

Re Southwark Street.

It appears to us that the Board should instruct their solicitor to acquaint the companies with the report of Mr. Bazalgette just read, by sending each of them a copy. We think, too, that notice should be given to them that the Board protest against any interference with the subways, and call upon the companies effectually to repair the mischief they have done, or to make compensation.

If the companies refuse to comply, then the cost of the injury should be ascertained, and the amount could probably be recovered in an action by the Board against the companies, if the amount shall be deemed worth proceeding for. This seems to be the only remedy which the Board has. It is assumed that the Board has a property in the subway and its materials, and the wrong done must be one of compensation in damages. We can discover no case for penalties or other remedy as regards the Board at present, but we think the Board should send a copy of the accompanying Report to the District Board of Southwark. The Metropolis Local Management Act of 1855 contains many sections giving the vestries and district boards powers of keeping the Gas and Water Companies within proper bounds. Sections 98, 109, 110, 111, 112, 113, 114, and 25 & 26 Vict. c. 102, s. 82.

(signed) *W. W. Smith.*

It was moved by Mr. Freeman, seconded by Mr. Carpmael, and

Resolved—That the Report be approved; that a copy of the Engineer's Report be sent to the Southwark and Vauxhall Water Company, and to the St. Saviour's District Board of Works, and that the matter be referred to the Streets Committee, with authority to take such steps as they may be advised for protecting the interests of the Board.

Appendix, No. 3.

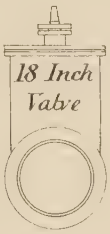
Appendix, No. 3.

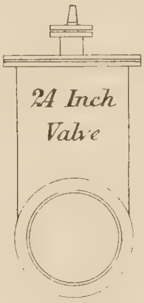
See Diagrams Opposite.

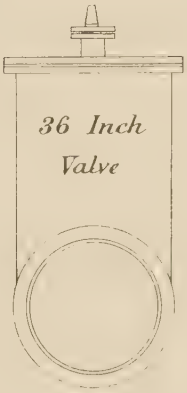
APPENDIX Nº 3.

DIAGRAMS

Delivered in by Mr. Hawksley, 3rd. July, 1867.







Scale ¼ of an Inch to a foot.

Appendix, No. 4.

REPORT on the ACCIDENT at the AUSTERLITZ BRIDGE during the Operation of RELAYING the GAS PIPE.

Appendix, No. 4.

Court of First Instance.

Department of the Seine.

Austerlitz Bridge Accident.

Statement.

On the 25th January, at 12 minutes past nine in the morning, an explosion, caused by the gas taking fire in the subway under the up-stream foot pavement of the Austerlitz Bridge, caused the death of two workmen who were employed in relaying the gas pipe laid in the subway, and seriously wounded two others.

M. De Lurcy, examining magistrate of the Court of First Instance of the Department of the Seine, appointed me, on the 8th of this month, a Commissioner (with power to examine witnesses) to look into all authentic reports drawn up on the occasion of the accident, to examine the spot, and make such formal declaration as I should consider of use; to hear the evidence of all persons who could give me useful information; to obtain an account of the manner in which the works executed by the Paris Gas Company were ordered, carried out, and inspected; and finally to report my opinion as to the causes of the accident, and the persons who could be considered to be responsible for it.

Having been duly sworn on the 9th instant, and having read the reports drawn up—

1. On the 25th January, at 9 h. 20 m. in the morning, by M. Henchard, Police Commissioner of the Quinze-Vingts District;

2. The same date, at half-past nine, by M. Le Brec, Police Commissioner of the Salpêtrière District;

3. On the 26th January, by the above-named M. Henchard.

I visited, on the 10th instant, the scene of accident, where, notwithstanding that considerable works had already been carried out towards repairing the substantial damage to the subway and to the pipes on the 25th January, I found almost in the same state as on that day the two excavations in which the workmen were injured. I was therefore able to authenticate, by inspecting some gas pipes which were still in their place, the effects of the explosions on those pipes and on the subway itself.

At the same visit to the spot, I took the evidence of the policeman who was at the gate of their station in the Val-Hubert Square at the moment of the accident, and of the superintendent who was on duty there. Lastly, I met on the spot Mr. Camus, sub-manager of the Paris Gas Company.

The next day, and the day after, I summoned to my office the chief engineer for the laying of the gas pipes and his two head assistants; then M. Michal, Inspector General of the Ponts et Chausées, and Director of the Municipal Service, who had of his own accord repaired to the scene of the accident immediately he was informed of it. This latter gentleman, who was accompanied on his visit by M. Belgrand, Chief Engineer of the Water and Drainage Service, handed me a memorandum of the report which this engineer (M. Belgrand) had drawn up on returning to his office after the visit, and another report drawn up on the 28th January by the Principal Inspector of Public Lamps, under the orders of the Chief Engineer, Alphand. With these documents before me, I have been able to give an account of all the circumstances which immediately preceded and followed the accident, and I will endeavour to give an idea of it as exactly as I can.

At the time when the Austerlitz Bridge was rebuilt in stone, there was constructed under the up-stream foot pavement a subway, in which there was in 1864 a gas pipe and a water pipe. The former was made of cast-iron and with india-rubber joints, in order to give it the flexibility necessary for avoiding escapes on a bridge exposed to continual vibrations. It had been laid with every possible care, and up to the 14th December last, there was reason to think that this system of joints was proof against any leakage; when suddenly, on the 13th December last, at 10 o'clock at night, one of these joints having given way, the gas escaped very copiously through the holes in the plates which closed the shafts of the subway. As soon as this fact was pointed out, the Engineer of the Paris Company in charge of the laying and maintenance of the gas pipes, hastened to erect pipes vertically over the shafts in the subway, and from that time all danger was at an end, through the dispersion of the gas in the air at such a height as that it was impossible for it to catch fire. At the same time they opened trenches at the two ends of the bridge, to cut off the pipe and plug up the two ends thus opened so as to stop the flow of gas.

Thanks to these sensible measures, all danger was at an end by two in the morning.

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Several days were employed by the Company in discussing the question of the pipe to be preferred for laying on the Austerlitz Bridge, the vibration of which was likely to become a cause of gas escapes, and it was only on the 30th December that they began to lay down the new pipe of wrought iron, pitched over, and with joints very accurately adjusted, which burst on the 25th January.

The works were interrupted by the new year coming in, and were not renewed until the 4th or 5th of January. They were to be completed on the 25th, when the accident took place. At this time, the new pipe was laid throughout the length of the subway; and the workmen were occupied at the two ends of the bridge in finishing off the joints and supplemental works of this important operation when the explosion took place.

The following was the exact situation at this time:—

At the extremity of the bridge, Val-Hubert Square, the joint between the old and new pipe was made by means of a valve or plug, and a mason (Bessiere) was engaged in finishing the walls of the shaft required to give access to this valve, and for working it.

In the trench that was opened at the end of the gallery on the Place Mazas several workmen were making the necessary preparations for lowering the valve and finishing the joint between the old and new pipe. Some of these workmen were in the trench occupied in fitting a leaden collar and preparing to put in the valve. M. Charpentier was unhappily standing in the place which this valve was to occupy, between the extremity of the old pipe and that of the new pipe.

The evening before they had finished piercing the holes for receiving the lead connections for carrying the gas to the lamp-posts on the bridge. This work had been done in the subway, and consequently with lights, and the workmen had not observed the slightest presence of gas, which, moreover, the lamps for lighting the workmen would have caught if any had escaped from the pipe through the holes they were making. Thus, then, up to the evening before, gas had neither found its way into the pipe nor into the subway, and no one could foresee the danger which was threatened.

On the 25th the workmen had nothing to do in the subway; as I have just said, they were working in the trenches without fire and without light, one at the valve laid in the Val Hubert Square, the other in the excavation made in the Mazas Square, when the explosion took place.

The effect of this explosion was, on one side, to break the valve, the fragments of which mortally wounded the man Bessiere. On the other side it drove back a part of the pipe in the trench on the Mazas Square, where Charpentier, crushed between the two ends of pipes, was killed on the spot, and Bechet and Sajet were seriously wounded at the same time.

The police commissioners of the Quintze-Vingts and Salpêtrière districts, who arrived on the spot a few moments after the accident, have in their reports given account of all the circumstances to which I have alluded, and they immediately opened an inquest to ascertain the cause of the present catastrophe.

The first of these functionaries thus expressed himself on the subject:—

> "Our inquiries, with the aid of the company's men, have by no means resulted in enabling us to discover the precise cause of the explosion. I have been forced to rest upon the hypothesis that a slight escape of gas near the valve became inflamed by communication with some fire, either a match or a pipe; or, as there was no conflagration after the explosion, that some action upon the valve was produced by gas accumulated in the pipe, and that after a prolonged pressure."

He consulted all the workmen and assistants whose evidence was taken upon the inquest which he opened, and they were unanimous in declaring that they could not explain the cause of the accident.

The commissioner of the Saltpêrière district, on his part, expresses himself as follows:—

> "We find that after having heard the evidence of all the persons employed by the gas company, engineers and others, the cause of explosion remains a matter of doubt. For our own part, after an attentive examination of the spot and the circumstances, we would sum up in the following way:—
>
> "The gas was shut off at the end of the Austerlitz Bridge by a key or valve. The pipes for taking the gas across the bridge, and which are laid in a subway constructed under the pavement, were not entirely laid but stopped short about four or five mètres (five or six yards) from Mazas Square. They would not, therefore, contain any gas, and if they did so, the gas was in open air. If, therefore, the explosion took place in the neighbourhood of the valve, this valve being fixed in the pipes must have had some flaw which allowed the gas to escape, and to permeate the whole length of the pipe up to the spot where it was disconnected.
>
> "It is there accordingly that, whether from one of the workmen's lamps or from a lighted match which a passenger may have thrown into the excavation, the gas escaping in the said works must have taken fire and run along to the valve behind which the body of gas under pressure was, and caused an explosion."

M. Belgrand, Chief Engineer to the Municipality, after his visit to the spot with M. Michal, made on the 25th of January (the day of the accident), a report, in which, having given an account of the event, and of the precautions taken by the agents of the company, he adds in conclusion, "No accident appeared possible under these conditions; moreover, for a month the company's men had been working in the subway in perfect safety. It is absolutely impossible to explain the cause of the accident, but it is certain that the valve closed badly, that the pipe in the subway became filled with the explosive mixture, and that some accidental cause, perhaps the dropping of a match, or a cigar end, set fire to this mixture." Lastly, M. Dumouza, Chief Controller of the Gas Service, acting for the principal inspector, who was engaged, thus expresses himself: "No clue can at present be found to the cause for which search is made; we have had to deal only with probabilities. Whether one of the two workmen who were killed by the explosion had the imprudence to smoke at his work, or a match or lighted cigar was thrown unawares into one of the trenches by a workman or a passer-by, we have not as yet been able to discover; but such a cause is probable; or did a stone striking against an iron edge produce a spark which was the means of firing the explosive mixture?—there is nothing to show. Turning to inquire how the explosive mixture was formed, there is no better means of coming to a precise determination. From the way in which the phenomenon showed itself, it appears to us possible that there existed a mixture of gas and air in the pipe. Now, to explain the formation of this mixture, it must be admitted that the valve, which was already fixed at the end next Val-Hubert Square, did not shut quite closely, and that the gas escaping from the valve continuously may have penetrated by degrees into the pipe, and then into the subway in a sufficient quantity to constitute the explosive mixture." He concludes his report by criticising the laying of gas pipes in sewers.

Observations and Opinion.

The result of the preceding statement is that the directors of the gas company had taken all the precautions which prudence dictated to prevent accidents during the construction of the very difficult works relating to gas pipes laid in the subway on the east side of the Austerlitz Bridge. These precautions were perfectly successful during all the time the works were in progress in the subway, where the workmen were lighted by numerous lamps scattered along the whole length of the subway. They were also sufficient the evening before, when the connections with the lamp-posts were being got ready; and it was when the works remaining to be done were being executed in the open air in the trenches, that the accident took place.

As the Police Commissioners, M. Belgrand, and the principal controller of the public lamps conceive, the gas that produced the explosive mixture, the firing of which caused the accident, could only get into the pipe and the subway by the valve. How it was that this valve which had hermetically sealed all passage against the gas from the 4th or 5th January to the 25th, came to allow the gas to flow on that day in such a manner as to produce the explosive mixture, is the first question I have taken into consideration, and which I think I have answered.

The mason, Bessieres, was building up round the valve a brick shaft, the object of which was, as I have stated above, to make a subterranean chamber round this valve, for the purpose of its being inspected and worked. This workman was of necessity hampered in his movements by the presence of this apparatus, enclosed in an exceedingly small space. If the apparatus got in his way, he may have pressed upon the end enclosing the rack, which is more than a mètre long and displaced the closing sluice of the valve; bricks which were being passed down to him may have fallen upon the end of the covering of the sluice; or, lastly, he or his man may, either in passing down materials, or in going down into the shaft, have communicated shocks to the valve, sufficient to derange the position of the sluice. This would have been enough to cause an escape which would supply the pipe with hydrogen gas, the mixture of which with the oxygen of the air would form the explosive gas, which at the time of the accident was in the pipe in the subway. In my opinion, after having carefully considered the subject, I do not think that one can otherwise explain the presence of gas in the pipe and in the subway, for had not the valve been disturbed, which unquestionably closed tightly up to the evening of the 24th, there could have been no escape on the 25th, inasmuch as the adhesion of two surfaces in contact increases rather than diminishes by lapse of time. It is impossible to suppose that the disturbance of the valve was the result of mischief, because it is known that an inspector was on duty close to the trench, that this trench was but three or four mètres distant from the police station, at the door of which one of the men stands; when again it is considered that is not easy to get down into the trench, and above all when there is no motive to account for an act of this nature.

Therefore I do not hesitate to attribute to the unfortunate Bessieres the disturbance of the valve sluice, the displacement of which caused the escape of gas that penetrated into the pipe and the subway.

But the gas might have accumulated in the pipe without causing an explosion. To produce that, a body in a state of ignition must have been thrown into the explosive mixture. I think that the same man, Bessieres, may himself have fired this sort of train, which he had laid. I found my opinion upon this. The statement of M. Henchard, Police Commissioner of the Quinze-Vingt district, which is dated the 26th of January, contains a declaration of the foreman in the following terms: "As for Bessieres, who I know is a smoker of cigarettes, he was not smoking at the moment when I left him, a minute or two before the explosion." In the Report of M. Le Brec, Commissioner of the Salpêtrière district, is a similar declaration of the workman, Poisonnier, Bessiere's assistant. "I did not see him smoking that day," said he, at the end of his deposition, which he concluded with the words, "I do not know the causes which can have occasioned the mishap." I myself examined policeman Maitrejean, who was sentinel at the gate of the station, and he informed me that Bessieres at mealtimes sometimes smoked a cigarette, sitting on the steps of the guard house. This policeman

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policeman affirmed, as did all the workmen who were examined by the Commissioner, that Bessieres was not smoking, meaning, probably, at the time of the accident.

However that may be, it is still certain, from the depositions of Robillard, Poisonnier, and even of Maitrejean, that Bessieres used to smoke cigarettes. The unanimity of the statements that were made immediately after the accident, when it was still uncertain whether Bessieres would die of his wounds, and from which it might be inferred that he used not to smoke, prove only one thing, viz., that there was an anxiety to avoid compromising him with the company. I entirely admit the correctness of what the foreman Robillard said, when he stated that Bessieres was not smoking at the moment when he visited him; as the company prohibit smoking, he would have taken care not to break this rule in the presence of his chief; but, for the same reason I can understand that, his chief having gone some instants before the explosion (*see* report of 25th January), he thought he would light a cigarette, with the certainty that he would have time to smoke it before another visit, and that he may have thrown his match into the subway. However that may be, the events of the 14th December and 25th January completely justify the position I maintained several years ago in a commission over which the Prefect of the Seine presided, when, by the light of several accidents that happened, when I was director of the municipal service, I combatted with MM. Belgrand and Michal the idea that that eminent administrator (the prefect) had entertained of laying gas pipes in the sewers to prevent the soil of Paris from being infected by the leakages which impregnated it with carburetted hydrogen. They also prove the immense service which M. Belgrand rendered to the City of London when, having recently been summoned before a Committee of the English Parliament, he vigorously combatted the same notion.

Opinion.

To sum up, my opinion is:—

1. That the accident on the Austerlitz Bridge was caused by a disturbance of the sluice of the valve placed in the shaft on the Val-Hubert Square, which disturbance caused a slight escape of gas sufficient to form an explosive mixture in the pipe.

2. That this disturbance can only have been caused by blows or displacements which can themselves be attributed only to the mason, Bessieres, who was working at the construction of the shaft intended to enclose the valve.

3. That the firing of the explosive gas in the subway and in the pipe must be attributed to a match which was used by the same man, Bessieres, for lighting a cigarette, having been thrown into the subway, rather than to any other cause.

4. Finally, that under these circumstances it is impossible to fix upon anyone the responsibility of an accident which constitutes a case of *force majeure.*

Paris, February 1865. (signed) *Mary.*

Appendix, No. 5.

PAPERS handed in by Mr. *Hawksley*, 3 and 4 July 1867.

Appendix, No. 5.

Dear Sir, Nottingham, 22 August 1862.

I HAVE been directed by the committee of the Gas Company to forward you a copy, which you will find annexed, of a letter received from the Corporation surveyor, with regard to the subway under the new street from the Poultry to Carlton-street; the committee will be glad to know your views upon the matter.

I am, &c.
(signed) *William Hunt*,
Clerk to the Company,
By *Henry E. Hunt*.

(Copy.)

New Street Works from the Poultry to Carlton-street.

Dear Sir, Nottingham, 11 August 1862.

I AM instructed by the Improvement Committee of the Town Council to inform you that they are now constructing, in the above street, a continuous subway or underground passage through the centre thereof, which will have lateral communications or sideways connecting the same with the properties on both sides. The main sewer will be constructed under the subway, and the house drainage will be laid from the several properties under the sideways to the central sewer.

It is intended that the sub and side ways shall receive the gas, water, and other pipes, telegraph wires, and all other things usually laid under the surface of streets, so that access may always be had directly to them, and that the continual annoying and expensive breakage up of the surface of the street for alterations, repairs, and connections may be prevented.

The Committee hope that these operations will have the concurrence of the Gas and Water and other Companies requiring the use of the street, and that as soon as completed, the necessary pipes and connections may be at once laid.

I may state that some time ago I mentioned this matter to Mr. Hawksley, as the engineer of the Company, and he expressed his approval of the same.

A plan of the street and of the subworks will be forwarded to you for the inspection of the Company, or may be seen at my offices at any time.

I am, &c.
(signed) *Marriott C. Tarbotton*,
Corporation Surveyor.

William Hunt, Esq.,
Clerk to the Nottingham Gas Company.

My dear Sir, Weekday Cross, 4 March 1865.

WILL you favour me with your opinion upon the letter of which a copy is annexed, before Friday next.

Yours very truly,
(signed) *William Hunt*.

Thomas Hawksley, Esq.,
30, Great George-street, Westminster, S. W.

Appendix, No. 5.

Dear Sir, Nottingham, 4 March 1865.

The Local Board of Health of this borough are about to construct a subway in Listergate, into which the gas and water mains are requested to be laid, so that the street when once formed, may not again have the pavement disturbed. The great traffic along that street renders this mode of laying the pipes particularly desirable, and the subway has already been constructed up part of the Low Pavement. The surveyor of the Local Board will give notice as soon as the subway is ready to receive the main and branch pipes, and the Local Board trust that the Gas Company will concur in carrying into effect this arrangement.

Yours, &c.
(signed) *Wm. Enfield,*
Town Clerk.

W. Hunt, Esq.,
Clerk to the Nottingham Gas Company.

NOTTINGHAM GAS.

30, Great George-street, Westminster, S.W.,
6 March 1865.

Dear Sir,

My experiences and convictions of the imminent danger to the public, as well as consequential injury to the Company which will result from the placing of gas pipes in subways, are too numerous and too strong to warrant me in recommending the Committee to adopt that method of distribution. The soil in which gas pipes are usually imbedded is a most perfect safety lamp; on the other hand, a subway is a receptacle for explosive compounds of the most violent and dangerous character.

On reference to your books, you will find that no operations of the Gas Company have caused an obstruction in Lister-gate, narrow as it is, for many years past; and as to the liability of future obstruction, this may be easily obviated by laying a gas pipe up each side of the street, in the manner almost universally practised in the case of wide and important thoroughfares.

I need scarcely recall to your recollection the recent decision of the House of Commons, or the still more recent explosion in a subway at Paris.

It is always a disagreeable task to offer unpopular advice; but when life and property will manifestly be perilled, without a commensurate advantage of a public nature, I feel bound to submit my opinions without hesitation or reserve.

I am, &c.
(signed) *T. Hawksley.*

Wm. Hunt, Esq.

Dear Sir, Nottingham, 13 March 1865.

Your letter of the 4th instant, requesting the gas mains may be laid in a subway about to be constructed in Wheeler-gate, was laid before the Committee on Friday last; and I am instructed, in reply, to state that experience has shown the course suggested by the Board could not be adopted without imminent danger to the public, as well as risk of enormous consequential liability to the Company.

The soil in which gas pipes are usually embedded is a means of safety, whilst a subway is a receptacle for explosive compounds of the most violent and dangerous character.

I am desired also to say that no operation of the Gas Company has caused an obstruction in Lister-gate, narrow as it is, for many years; and the liability to future obstruction may be readily obviated by laying a gas pipe up each side, in the manner universally practised in wide and important thoroughfares.

By direction of the Committee I, some time ago, acquainted you with the objections the Company entertained to laying mains in subways; and the evidence upon the subject, laid before a Committee of the House of Commons, with that Committee's decision; and the still more recent explosion, with the consequent loss of life and injury to property, at Paris, have served to confirm their objections.

I am, &c.
(signed) *William Hunt,*
Clerk to the Company.

William Enfield, Esq.,
Town Clerk.

Dear Sir, Weekday Cross, 11 August 1865.

By direction of the Committee I send you a copy of a letter from the town clerk, and the report therein referred to, with reference to the subway in Lister-gate.

The Committee would be glad to be furnished with your observations and opinions.

I am, &c.
(signed) *William Hunt,*
By *Henry E. Hunt.*

T. Hawksley, Esq.,
30, Great George-street, S.W.

(Copy.)

Dear Sir, Nottingham, 10 August 1865.

I am directed to send you the accompanying copy report of the Improvement Committee, presented to, and adopted by, the Town Council, on 7th August instant, as to the subway in Lister-gate and Low Pavement, and to request that the directors of the Nottingham Gas Light and Coke Company and their engineer, Mr. Hawksley, will have the goodness to give this question their favourable consideration, as being an experiment for the improvement of the town, in which much interest is taken, and will be pleased to comply with the request contained in the report.

An early answer is desirable, as the paving of Lister-gate will shortly be commenced.

Yours, &c.
(signed) *William Enfield,*
Town Clerk.

William Hunt, Esq.,
Clerk to the Nottingham Gas Light and
Coke Company.

Town of Nottingham, to wit.

At a Quarterly Meeting of the Council of the Borough of Nottingham (acting also as the Local Board of Health of the said Borough), held at the Guildhall, in the said Borough, on Monday, the 7th day of August 1865—

The following report of the Improvement Committee is read:—

THE IMPROVEMENT COMMITTEE

Report (*inter alia*),—

That the sewers and subway in Lister-gate, and adjoining part of the Low Pavement, have been completed.

That the subway has been constructed in conformity with the order of the Local Board, for the purpose of receiving and holding the sewers, branch drains, water and gas pipes and branches, and telegraph wires, so as to afford convenient communication with those services to the several properties, and so as to prevent the constant breaking up of the streets, and consequent injury thereto, and stoppage of the traffic.

That the sewers and drains have been already laid, and the telegraph wires are about to be laid within the subway.

That it is intended to give the Water and Gas Companies the use of these subways for placing and holding their mains in, free of any charge by this Local Board.

That the traffic of Lister-gate is greater and more constant than in any other street of this town.

That the subway is well ventilated, and can be used with equal safety to those in Victoria-street and Queen-street for holding water and gas mains.

That under all the special circumstances of the case, the Gas and Water Companies be earnestly requested to direct their mains to be laid within the new subways in Lister-gate and Low Pavement, with a view of preventing the constant taking up of the pavement and injury to the street, and also for the purpose of assisting the Local Board in their endeavours to ascertain the best practicable means of forming streets in large towns, and to prevent the great inconveniences which accrue to the public under the present arrangements in respect of sewers, drains, gas, water, and other pipes, a question which is not only of local, but of national interest and importance.

Whereupon the above report was received and adopted; and it was ordered that a copy thereof be sent to the Gas and Water Companies, and that they be respectfully asked to comply with the request therein contained.

Extracted, 10th August 1865.

(signed) *William Enfield,*
Town Clerk.

NOTTINGHAM GAS.

30, Great George-street, Westminster, S.W.,
12 August 1865.

Dear Sir,

I am in receipt of your favour of yesterday's date, with its enclosure. I confess I do not know how to deal with the matter, as an engineer, seeing that all the new facts are confirmatory of the reports I have already made; and consequently of the great danger which would result to the public, as well as to the interests of the Company, from the introduction

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introduction of gas mains into a subway. That an explosion would sooner or later happen, most probably with great destruction of life and property, I do not doubt. The *facts* are all on one side, the *opinions* all on the other. It is a very significant circumstance, that since the evidence given before Parliament, there has been a serious explosion, attended with loss of life, in the one remaining subway, with gas pipes, in Paris.

The question is really for the Board to decide, under the advice of their own solicitor, who will be better able than I am to estimate the legal responsibilities and pecuniary liabilities which would attach to the Company in the event of an accident occurring.

I may remark, for the consideration of the Committee, that the Corporation have constructed the subway in question, after and notwithstanding that Parliament had decided against giving the Metropolitan Board of Works the powers they sought, and after the Corporation had full knowledge that the Gas Company entertained a decided repugnance to encounter the risks and liabilities consequent upon placing their gas mains in the subways.

I may also remark that pipes were placed in the Covent Garden subway under exactly similar circumstances to those in which the pipes were placed in the first Nottingham subway, viz., because the subway was made first, and then the Companies were teazed into using it. The Covent Garden subway is an insignificant work, being little more than the length of the Bridge of Austerlitz, at Paris, which was blown up a few months ago by a gas explosion.

It is also worthy of observation, that so unsafe do the workmen of the Nottingham Company feel in the Victoria-street subway, small and little used as that work is, that they decline to enter the subway unless they are protected by having the gas shut off at both ends of the street—a condition impossible to comply with in the case of trunk mains, and which it will become impossible to continue, even in the case of Victoria-street, if gas should be consumed by the occupiers of the houses in that street in the day-time.

I believe there is no foundation whatever for the assumption that Parliament is likely to change its mind, and but little ground for the belief that they will be asked to do so. I know the Gas Companies of the metropolis will offer every opposition in their power to any future application to Parliament, and I believe that opposition, based, as it will be, upon sound grounds, will prevail.

Personally I should much prefer that the application of the Corporation should be complied with, because I am perfectly aware it will be alleged against me that I am resisting the introduction of a valuable and important public improvement on unfounded apprehensions and insufficient grounds; the Committee must therefore do me the justice to believe that it is with very much reluctance I advise them to consider well before they determine to adopt the views set forth in the communication enclosed to me.

In a former letter I have shown that the pipes of the Company may be so laid as that no subsequent interruption of the thoroughfare shall result.

I am, &c.
(signed) *T. Hawksley.*

H. E. Hunt, Esq.

Dear Sir, Nottingham, 29 August 1865.

I HAVE laid your letter of the 10th instant, and its accompanying copy report, before the directors of the Gas Company, and I am instructed in reply to say that, after mature deliberation, the directors have very reluctantly come to the conclusion that they cannot prudently accept the responsibility of complying with the request of the Corporation with reference to the placing of the Company's mains in the subway in Lister-gate and Low Pavement.

The directors are advised that all the new facts only confirm the conclusion at which they had previously arrived of the great danger which would result to the public, as well as the interests of the Company, from the introduction of gas mains into a subway.

That an explosion would, in that case, sooner or later happen, most probably with great destruction of life and property, there seems no reason to doubt, and a very grave responsibility would in consequence most assuredly rest upon the Company.

It is a very significant circumstance that since the inquiry before the House of Commons, there has been an explosion attended with loss of life in the one remaining subway with gas pipes in Paris.

I am also to remind you that the Corporation have constructed the subway in question after and notwithstanding that Parliament had, after full inquiry, refused to give the Metropolitan Board of Works powers to compel the Metropolitan Gas Companies to lay their mains in subways, and after the Corporation had full knowledge that the Gas Company entertained a decided repugnance to encounter the risks and liabilities consequent upon placing their mains in subways.

It is also worthy of observation that so unsafe do the Company's workmen feel in the Victoria-street subway, small and little used as that work is, that they declined to enter it unless they are protected by having the gas shut off at both ends of the street, a condition impossible to be complied with in the case of trunk mains, and which it will be impossible to continue, even in the case of Victoria-street, if gas should be consumed by the occupiers of houses in that street in the day-time.

In my letter of the 13th March last a mode of laying the pipes of the Company, so that no subsequent interruption of the thoroughfare should result, was pointed out, and the directors consider that the Company's mains should be laid in that way as being on the whole the most convenient and safe manner in which their operations can be conducted in the thoroughfare in question.

The directors desire me further to say, that they would have been very glad if they could, consistently with their duty to the public and the Company, have complied with the wishes of the Corporation, and that it is only after the most anxious consideration that they have come to the conclusion that they would not be justified in acceding to the request of the Corporation to try what is admitted by them to be an experiment, and which the directors respectfully submit ought not to be tried at the risk of the Company, if any mode can be suggested, as verbally intimated by you, by which the Company could be satisfactorily indemnified and protected against any risk, responsibility, or loss, the directors might reconsider their determination.

I am, &c.
(signed) *William Hunt.*

W. Enfield, Esq., Town Clerk.

(Copy.)

At a Meeting of the Committee, held at the Radford Works the 25th August 1865,

Read again town clerk's letter of the 10th instant, with reference to the placing of the Company's mains in the subway in Lister-gate and the Low Pavement: also, Mr. Hawksley's letter to the clerk of the 12th instant, containing his observations on the subject: also, draft reply proposed to be sent to the town clerk.

Resolved, That such reply, with an additional paragraph, stating that it is probable that if the Corporation can offer the Company a satisfactory indemnity against all claims whatsoever which may be made upon them for destruction and injury to life and property, the committee may reconsider their decision, be approved.

Town Clerk's Office, St. Peter's Church Side,
Nottingham, 22 November 1865.

Dear Sir,

I AM desired to ask that the laying the gas main on the east side of Lister-gate may be stopped until the deputation and Mr. Tarbotton can see the committee of the Gas Company, and that a meeting of the committee may as early as convenient be held for the purpose. The long and severe illness of Mr. Tarbotton has for several weeks rendered it impracticable for him to attend a meeting.

Yours, &c.
(signed) *W. Enfield.*

Wm. Hunt, Esq.,
Clerk to the Gas Company.

AT a Special Meeting of the Committee, held at the Gas Office, Nottingham, the 23rd November 1865,

Read letter of the town clerk, requesting the works in Lister-gate to be suspended, and that a meeting of the Committee might be called to receive a deputation of the Corporation upon the subject.

A deputation, consisting of Mr. Patchitt, Mr. Tarbotton, and the town clerk now attend the meeting, and request that the gas mains may be laid in the subway in Lister-gate, and state that the Town Council would be willing to take the moral responsibility, and also pass a resolution agreeing to take the pecuniary responsibility.

Resolved, That the reasons of the Company for declining to lay their mains in the subway in Lister-gate, in accordance with the request of the Town Council, have on several occasions been so fully made known to the Corporation, that it is unnecessary now to repeat them, and subsequent occurrences in various places have only tended to confirm those objections. The committee, therefore, feel it to be their duty, both in the interests of the public and of the Company, to adhere to their previous resolution of laying the mains on each side of the road, but outside the subway.

Appendix, No. 5.

SUBWAYS.

My dear Sir, Nottingham, 24 September 1866.

On the other side you have a copy of another application from the town clerk. What reply are we to send to it?

Yours, &c.
(signed) *William Hunt.*

Thos. Hawksley, Esq.,
30, Great George-street, Westminster, S.W.

(Copy.)

Town Clerk's Office, St. Peter's Church-side, Nottingham,
21 September 1866.

Dear Sir,

I am desired to ask that the main and branch pipes of the Nottingham Gas Company may at once be laid in Market-street, as it is intended to pave this street as soon as it is consolidated.

The surveyor of the Local Board will be glad to accompany the directors of your Company through the subway in this street, which is well ventilated and lighted, if they will be pleased to inspect it. And the committee will be glad if the directors of the Nottingham Gas Company will direct their main and branch pipes to be laid in this subway.

Yours, &c.
(signed) *Wm. Enfield,*
Town Clerk.

W. Hunt, Esq.
Clerk to the Nottingham Gas Light and Coke Company.

(Extract.)

30, Great George-street, Westminster, S.W.,
25 September 1866.

My Dear Sir,

* * * * * *

I wish clearly to draw a distinction between gas and water pipes. Water pipes are, for many reasons, better placed out of subways than in them; still, as they can be placed in subways at some loss of money and convenience, of which the worst is known, it may well be that a water company may, in the interests of peace and quietude, consent to use them; not so, however, as regards gas pipes. In this case the danger to the public must be considered in the first place, and the liabilities of the Company in the next place.

On one point I must be very express. It is quite futile to talk of ventilation; making apertures is not making ventilation; it is simply providing means for ventilation; but, as we all know, ventilation does not always go on because or for the reason that openings are made.

If the Corporation wishes to avoid the opening of the streets, it is quite easy to meet their wishes by laying down a smaller pipe on each side of the carriage-way, instead of in the centre of it.

I confess I am amazed at the subway mania, for it is nothing less, even granting all that is alleged with regard to the inconvenience of breaking up the pavements, because, to prevent a minor evil, it does not hesitate to seek the introduction of an evil of vastly greater magnitude, and one against which no reasonable amount of precaution can certainly provide.

With all the experience we have had of explosions in subways and subway-like places, and with the knowledge that no explosion ever did happen in the soil, it appears to me to be the extreme of rashness to persist in so wild an endeavour to endanger life and property.

I know it is the fashion of the Corporation of Nottingham to attack me personally on this question, but I have a clear and distinct duty to perform to the Company. My advice to the Company, therefore, is not to lay gas pipes in subways.

I am, &c.
(signed) *T. Hawksley.*

W. Hunt, Esq.

Dear Sir, 29 September 1866.

Your letter of the 21st instant, asking that the branch pipes of the Company may be laid in Market-street, and stating that the committee of the town council would be glad if the directors of the Company would direct such main to be laid in the subway, was laid before the Committee of the Gas Company yesterday.

In reply, I am directed to state that the Gas Committee see no reason to alter their determination of the 23rd of November last (which was communicated to you the next day),

day), with reference to a similar application, and they therefore decline to accept the risk and liabilities consequent upon placing gas mains in subways.

I am further to say that the committee are ready at any time to lay the branch mains in Market-street in the same manner as in Lister-gate.

Yours truly,
(signed) *Wm. Hunt*,
Clerk to the Company.

William Enfield, Esq., Town Clerk.

My dear Sir,
Nottingham, 4 March 1865.

On the other side I send you copy of a letter from the town clerk, and shall be glad to hear from you on the subject there referred to.

I am, &c.
(signed) *John Rogers Browne.*

T. Hawksley, Esq.,
30, Great George-street, Westminster, London.

(Copy.)

Town Clerk's Office, St. Peter's Church-side, Nottingham,
4 March 1865.

Dear Sir,

The Local Board of Health of this borough are about to construct a subway in Lister-gate, into which the gas and water mains are requested to be laid, so that the street when once formed, may not again have the pavement disturbed.

The great traffic along that street renders this mode of laying the pipes particularly desirable, and the subway has already been constructed up part of the Low Pavement.

The surveyor of the Local Board will give notice as soon as the subway is ready to receive the main and branch pipes, and the Local Board trust that the Waterworks Company will concur in carrying into effect this arrangement.

Yours truly,
(signed) *Wm. Enfield*,
Town Clerk

J. R. Browne, Esq.,
Clerk to the Nottingham Waterworks Company.

Nottingham Water.

30, Great George-street, Westminster,
7 March 1865.

Dear Sir,

In reply to your inquiry I have to observe that, in my opinion, the water pipes ought to be laid in the soil rather than in the subway. Nevertheless in the *particular case* put, viz., that of Lister Gate, it is really of comparatively little moment whether the water pipes are placed in the subway or not, providing the gas pipes are *not* laid there, and providing there are no foul emanations from the sewers.

The cost will be greater in the subways than in the ground; but this the directors will, perhaps, consider to be a matter of inferior importance, as the subway system, either in Nottingham or elsewhere, is not at all likely to prevail to any serious or inconvenient extent.

It is in fact a very expensive improvement in a retrogressive direction.

I am, &c.
(signed) *T. Hawksley.*

J. R. Browne, Esq.

My dear Sir,
Nottingham, 12 August 1865.

I enclose you a copy of a letter just received from the town clerk, with a copy of the report to which he refers, and shall be glad if you will let me know your opinion as to whether the request of the Town Council that the water pipes may be laid in the subway may be acceded to.

I remain, &c.
(signed) *John Rogers Browne.*

Thomas Hawksley, Esq.,
30, Great George-street, Westminster, London.

Appendix, No. 5.

(Copy.)

Town Clerk's Office, St. Peter's Church-side,
Nottingham, 10 August 1865.

Dear Sir,

I am directed to send you the accompanying copy report of the Improvement Committee, presented to, and adopted by the Town Council, on 7th August instant, as to the subway in Lister-gate and Low Pavement, and to request that the directors of the Nottingham Waterworks Company and their engineer, Mr. Hawksley, will have the goodness to give this question their favourable consideration, as being an experiment for the improvement of the town, in which much interest is taken, and will be pleased to comply with the request contained in the report.

An early answer is desirable, as the paving of Lister-gate will shortly be commenced.

Yours, &c.
(signed) *William Enfield*,
Town Clerk.

J. R. Browne, Esq.,
Clerk to the Nottingham Waterworks
Company.

Town of Nottingham, to wit.

At a Quarterly Meeting of the Council of the Borough of Nottingham (acting also as the Local Board of Health of the said Borough), held at the Guildhall in the said Borough, on Monday, the 7th day of August 1865, the following Report of the Improvement Committee is read:—

The Improvement Committee report (*inter alia*)—

That the sewers and subway in Lister-gate and adjoining part of Low Pavement have been completed.

That the subway has been constructed in conformity with the order of the Local Board, for the purpose of receiving and holding the sewers, branch drains, water and gas pipes, and branches, and telegraph wires, so as to afford convenient communication with those services to the several properties, and so as to prevent the constant breaking up of the streets, and consequent injury thereto, and stoppage of the traffic.

That the sewers and drains have been already laid, and the telegraph wires are about to be laid within the subway.

That it is intended to give the Water and Gas Companies the use of these subways for placing and holding their mains in, free of any charge by this Local Board.

That the traffic of Lister-gate is greater and more constant than any other street of this town.

That the subway is well ventilated, and can be used with equal safety to those in Victoria-street and Queen-street for holding water and gas mains.

That under all the special circumstances of the case, the Gas and Water Companies be earnestly requested to direct their mains to be laid within the new subways in Lister-gate and Low Pavement, with a view of preventing the constant taking up of the pavement and injury to the street, and also for the purpose of assisting the Local Board in their endeavours to ascertain the best practicable means of forming streets in large towns, and to prevent the great inconveniences which accrue to the public under the present arrangements in respect of sewers, drains, gas, water, and other pipes, a question which is not only of local but of national interest and importance.

Whereupon the above report was received and adopted, and it was ordered that a copy thereof be sent to the Gas and Water Companies, and that they be respectfully asked to comply with the request therein contained.

Extracted, 10th August 1865.

(signed) *Wm. Enfield*, Town Clerk.

NOTTINGHAM SUBWAY.

30, Great George-street, Westminster, S.W.,
14 August 1865.

My dear Sir,

On the 7th of March I wrote to you on this subject, and beg to refer you to my letter of that date.

If the Gas Company lay pipes in the subway the Water Company had better keep out of it, as an explosion is sooner or later inevitable; but if the Gas Company do not lay their pipes in the subway, the question is then reduced to one of cost and convenience on the one side, and of the amount of desire to avoid negativing the application of the Corporation on the other side. These are considerations for the directors.

I am sure the construction of subways for the reception of gas and water pipes is a great practical mistake, but especially so with regard to the reception of gas pipes. The numerous and fatal explosions which have occurred elsewhere in these and other similar constructions, ought to induce all public authorities to reflect seriously on the dangerous conditions touching the public safety, they are making themselves morally responsible for, by inducing Gas Companies to insert pipes in subways. The pecuniary liability will, however, remain with the Companies, with *which* it will be impossible to say, because if an explosion should occur when a servant of the Water Company is at work in the subway, it will of course be charged to a negligent act of the Water Company.

Faithfully yours,
(signed) *T. Hawksley.*

J. R. Browne, Esq.

My dear Sir, Nottingham, 8 December 1865.

* * * * * * *

I enclose you a copy of a minute respecting the laying of the pipes in the subways in Low Pavement and Lister-gate made at the monthly meeting of the Board yesterday, and shall be in London on Tuesday morning next, and will do myself the pleasure of calling on you on this subject, and also as to removing Mr. Spooner's objections to the sale of the site in Bestwood-park, if possible. I will be with you at 10 o'clock on Tuesday morning, if convenient to you; but if not, please send me another appointment by return of post, as I shall leave Nottingham on Sunday evening.

Yours, &c.
(signed) *Freeth, Browne, & Rawson.*

Thos. Hawksley, Esq.,
No. 30, Great George-street, Westminster.

(Copy.)

7 December 1865.

Mr. Parsons, Mr. Barber, and Mr. Tarbotton attended as a deputation, and requested the Company to lay their pipes in the subway in Low Pavement and Lister-gate, the Corporation guaranteeing the Company from all expenses and consequences whatsoever.

Such application was taken into consideration by the Board, and it was resolved unanimously that, provided Mr. Hawksley approve, and under limits and conditions to be settled by him, the request of the Corporation be acceded to.

Subways.

Dear Sir, Nottingham, 16 December 1865.

You were good enough to say you would write me a letter on this subject, to be laid before the Board; I should be very glad to receive it, as my instructions were to convene a special meeting of the Board after seeing you.

Yours, &c.
(signed) *John Rogers Browne.*

Thos. Hawksley, Esq.,
30, Great George-street, Westminster, London, S.W.

Nottingham Water.

30, Great George-street, Wesminster, S.W.,
19 December 1865.

My dear Sir,

I have heretofore so fully stated the views and experience of the profession on the subject of the inexpediency of the making of subways as receptacles for pipes, that I have now nothing to add, except to state that the events of the past 12 months have fully confirmed all prior knowledge.

The Companies established in London will not place their pipes in the subways; and it may be added that the Corporation of Manchester, which possesses both gas and waterworks, and has also the control of the streets, makes no subways. The subway system is, in fact, a very imaginative and extremely expensive way of doing more harm than good.

As

Appendix, No. 5.

As respects Lister-gate, if it were not for the principle involved, the question would not be worth debating; the street is not 200 yards long; the Company's pipe is only eight inches diameter, and near the extremity of the district; and all the cocks, mains, fire plugs, branches, bends, washouts, and other specials, very inconvenient in subways, may be kept beyond the two ends of the subway in question. Hence the particular case is reduced to one of no practical importance to either party.

Faithfully yours,
J. R. Browne, Esq. (signed) *T. Hawksley.*

30, Great George-street, Westminster, S.W.,
22 March 1864.

My dear Sir,

I HAVE never been in favour of the subway system, and do not believe that system can be usefully applied in the metropolis or elsewhere. I thought I had made myself very clearly understood on this matter when so many of us met together to consider which plan the proposed premium should be awarded to. We recommend the best only in the sense of the one that was in our view the least objectionable.

I am much obliged by your offer of a retainer on behalf of the Board, and really regret my inability on the present occasion to accept it.

I am, &c.
J. W. Bazalgette, Esq. (signed) *T. Hawksley.*

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TO THE

MINUTES OF EVIDENCE

TAKEN BEFORE THE

SELECT COMMITTEE

ON

METROPOLIS SUBWAYS BILL.

Ordered, by the House of Commons, *to be Printed*,
30 *July* 1867.

495—I.

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B.

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Particulars relative to a serious escape of gas in the gallery on the bridge of Austerlitz, in 1864; suffocating state of the atmosphere on this occasion, notwithstanding that there were six shafts or ventilators in operation, 3239–3263——Sundry details in connection with the explosion at the Bridge of Austerlitz on 25th January 1865; conclusion as to the explosion having occurred not only in the gas pipe, but in the subway, 3265 *et seq.* ——Great damage done by the explosion in January 1865; 3277–3279. 3295——Two men were killed by this explosion, and two others more or less hurt, 3280.

Reference to a report by M. Mary upon the explosion of January 1865, in which the cause of the explosion is considered to have been an accident to the valve, 3282–3284 ——Several openings for ventilation at the time of the explosion, 3286, 3287. 3292—— Re-construction since the explosion, the gas pipe being now enveloped in sand, 3290—— Report made by witness shortly after the explosion adverted to as having required some correction; this report was furnished to Mr. Bazalgette, 3293, 3294. 3321–3328.

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Circumstance of the gas pipes being still retained in the Place Napoleon, whilst there has been only one explosion there, by which no one was injured, 3363–3366——Occurrence of several explosions in sewers in Paris, from escapes from gas pipes laid in the earth, 3377, 3378——Formation of the subways or galleries in Paris, of stone, those in London being built of bricks, 3384–3386——Combination of sewers and subways in Paris, as regards the laying of water pipes, 3387.

Belgrand, M. Refusal of the Committee to place upon the minutes a certain letter from M. Belgrand, dated 6th July, *Ev.* p. 317.

Bent Pipes. Facility of using bent pipes in making connections between pipes in subways and pipes in streets at right angles, *Bramwell* 1033——Doubt as to there being any unusual expense for bends in communicating from subways to pipes at higher levels in the streets, *Bazalgette* 2828–2831——Facility of obtaining bent pipes to any amount, and of applying them where required, *ib.* 2878–2882.

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Boulnois, William Allen. (Analysis of his Evidence.)—Architect; has considered the question of subways, and is conversant with the system of laying gas and water pipes in Paris, 1199–1202. 1208——Was one of those requested by the Metropolitan Board to report upon the Paris subways; confirms the evidence of Mr. Hemans and Mr. Bazalgette on the subject, 1203–1207. 1231, 1232——Considers that both for gas pipes and water pipes, the use of subways would be very desirable, not only for the public, but for the companies, 1208.

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Reference to the explosions in Paris as affording no valid objection against laying gas pipes in subways, 1231, 1232. 1271–1274——Less danger by the use of subways, as the pipes would be more accurately laid, and leakage would be readily detected, 1233, 1234——Suggested arrangements in regard to the service pipes in subways, and the use of cocks, 1235–1237——Grounds for concluding that an explosion in a subway would not be a very serious matter, 1238, 1239. 1266–1270. 1282–1284——Sufficiency of the means of ventilation in the existing subways in London; facility of providing increased ventilation, 1240–1242. 1258.

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Bramwell, Frederick Joseph. (Analysis of his Evidence.)—Civil and mechanical engineer; has paid considerable attention to the question of gas explosions, 985–989——Has inspected the subways in Paris, London, and Nottingham, and has become confirmed in the opinion that subways are a great advantage not only to the public, but the gas and water companies, 990–1001——Shows the great contamination caused in the adjacent soil by laying gas pipes in streets, whilst there is no taint of gas in the soil when the pipes are laid in subways, 1003–1009.

Important advantage of the facility of laying pipes in subways, and of detecting imperfections, 1010–1012. 1015——Advantage also of the facility of jointing, without opening the ground for the purpose, 1013. 1016–1020——Freedom from corrosion of the pipes in subways, 1013, 1014——Decrease of leakage in subways, owing to the better laying of the pipes in the first instance and the facility of inspection, 1015——Hurried and defective manner in which joints are made under the present system, 1016–1020.

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Great improbability of wilful explosions in subways in the event of public disturbances, 1102–1107. 1137——Further conclusion as to the adequacy of ventilators in the roof for carrying off escapes, whether from loose joints or from wilful fractures, 1108–1115——Belief that subways would reduce the probability of explosions to a minimum, 1127, 1128——Avoidance of the Wood-street explosion if the pipes had been in a subway, 1128–1131.

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Universal use of subways or sewers in Paris for water pipes, 1177——Ample means of escape into the sewers in the event of a water pipe bursting in the subways; stoppage also of the flow from the pumping stations, 1178–1187——Timidity of French engineers in regard to placing gas pipes in subways; defective arrangements in Paris in regard to gas pipes and fittings adverted to hereon, 1189–1195.

[Second Examination.]—Information in connection with some openings in the Southwark-street subway, irrespectively of the upright shafts, 3758–3763——Explanation as to this subway having originally been ventilated in two different ways, one of which has since been abandoned in favour of the other, 3761–3765.

[Third Examination.]—Explanation of the provision made for the ventilation of the subway at the Place Napoleon Trois in Paris; reference more especially to the character of the openings into the street, 3996–4002.

Brothers, Horatio. (Analysis of his Evidence.)—Is engineer to the Equitable Gas Company; has had many years' experience of gas, 4514–4517——Request of the Metropolitan Board at which witness's company laid two five-inch pipes in the subway in Garrick-street, 4518–4521——Stipulation made by the company that the pipes should be buried in earth, so that any leakage might be absorbed, 4522–4530——Conclusion as to the insufficiency of the ventilation in the subway, 4531–4542——Leakage experienced in the case of some mains and pipes in a covered way at the works of the Equitable Company, 4532.

Several respects in which there is greater liability to accident in laying the mains and making alterations and repairs in subways than in streets, 4543–4547. 4549–4554——Necessity of a subway in such a thoroughfare as Parliament-street, being equal to the whole width of the street, 4548. 4555. 4593–4595. 4621–4628——Insufficiency of reflectors for working by in subways, 4551——More careful character of the work when done in open trenches, on account of the better supervision than in subways, 4552, 4553. 4656–4658.

Great difficulty apprehended in placing large mains in subways in addition to other mains and pipes already there, 4556–4558——Considerable difficulty if it were necessary to replace the smaller gas pipe in the Southwark-street Subway by a large one, 4559–4561——Obstacle to laying the gas pipes in this subway on an inclination in order to drain themselves, 4564–4566——Insufficiency of the ventilation of the subway to prevent the formation of an explosive mixture if there were an escape, 4567, 4568.

Liability to fractures of pipes in subways by carelessness on the part of workmen, 4569–4572——Facility of dealing with large escapes in open trenches as compared with subways, 4573–4575——Dissent from Mr. Carpmael's view as to gas leakages being detected through a discolouring of the pipes if whiteleaded, 4576, 4577——Difficulty in detecting the place of escape in a subway, except by applying a light, 4578–4581.

Comparative harmlessness of escapes and explosions under the present system, so that it is very imprudent to run the risk of subways, 4582–4587——Inconvenience caused by shutting off the supply of gas in Garrick-street, when anything is being done to the pipes in the subway, 4588–4590——Enormous expense involved in any large extension of subways, 4596——Incidence indirectly upon the consumers of any rent charged for the subways, 4597.

Brothers, Horatio. (Analysis of his Evidence)—*continued.*

Expediency of the Metropolitan Board being at the expense of relaying the pipes, if the companies are compelled to enter the subways, 4598. 4604–4606. 4668——The Metropolitan Board should also be responsible for accidents; difficulty otherwise in fixing the responsibility, 4598–4603——Confirmation since 1864 of the views then expressed by witness in opposition to the use of subways, 4607, 4608.

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Question considered whether the gas supply to any house might not be stopped readily by means of a cock in the subway, instead of breaking open the pavement in order to cut off the supply; exception taken to the former plan, 4634–4645——Data for concluding that the cost of laying pipes was greater in the Garrick-street subway than in the streets, 4646–4655——Opinion that the companies, if compelled to use the subways, should pay no rent, 4669——No demand for rent was made as regards the Garrick-street subway, the Metropolitan Board having been anxious that the pipes should be laid there as an experiment, 4670–4673.

Burdett-road. See *Victoria Park Approaches.*

Bye-Laws. Circumstance of its being provided by the Bill that the Metropolitan Board are to have the power of making bye-laws for the supervision and regulation of the subways, *Simpson* 4128, 4129.

C.

Campbell, Dugald. (Analysis of his Evidence.)—Analytical chemist; concurs in the evidence of Dr. Frankland, as to the innocuous leakage of gas in the Southwark-street subway, and as to the absence practically of all danger of explosion, 2245 *et seq.*————Effect of the ventilation in the subway to cause any leakage to ascend to the roof, instead of accumulating in the side galleries, 2249–2260——Harmless character of any explosion that might occur, so long as the ventilators are in operation, 2261–2268.

[Second Examination.]—Supplies sundry particulars in connection with some recent experiments with escapes of gas in the Southwark-street subway; concurrence generally in the evidence of Dr. Frankland, as to the immunity from danger shown by these experiments, 4936 *et seq.*——Results of the tests applied as to the per-centage of gas near the ventilators throughout the experiments; absence of increase after the first fifteen minutes, 4939–4966——Freedom from gas at the bottom of the subway at the time that it was escaping through the ventilators, 4967–4973.

Conclusion as to the safety of subways for gas pipes, unless some unforeseen contingencies should arise, 4974–4979——Doubt as to certain explosions in Paris affording any argument against subways, 4980, 4981——Supply of the 18-inch main in the Southwark-street subway by an inch and a-half pipe, 4982——Statement upon the question of the atmosphere in the Southwark-street subway, having been made very warm during the experiments by the lighting of the jets from the pipes, 4983–4994.

Chairs or Supports (*Pipes in Subways*). Contemplated laying of the pipes upon brick or wooden chairs on top of the concrete or gravel, *Bazalgette* 528–533——Opinion favourable to laying the pipes on the concrete floor instead of in gravel, *Bramwell* 1050–1053——Proposed support of the pipes on brick piers, *ib.* 1052——Contemplated use of brick piers in subways; this would add about sixpence a yard to the expense, *R. Jones* 1594–1598——Greater cost estimated by witness than by his father for chairs or supports for the pipes, *H. E. Jones* 1785–1799——Suggestion as to the kind of pier necessary for the support of the pipes, *Easton* 1971.

Chartered Gas Company. Circumstance of the Chartered Company having applied for power to lay pipes in the Thames Embankment subway; many of the directors are, however, apprehensive of danger by the use of subways, though witness would gladly avail himself of them, *Evans* 1465. 1469–1476. 1504–1513——Petition by witness's company against the present Bill, on account chiefly of the apprehensions of some great explosion arising, *ib.* 1504–1513. 1532, 1533.

See also *Explosions*, 5. *Goswell-street Station.*

Cheapside. Reference to a certain diagram as showing the great difficulty of placing the pipes now in Cheapside in such a subway as that in Garrick-street; cross-examination hereon, *Muir* 2460–2491. 2535–2539.

Church-street, Shoreditch. Serious and fatal explosion of gas in Church-street, Shoreditch, which would not have happened had the gas pipe been in a subway, *Bazalgette* 2870.

Commercial Gas Company. Circumstance of the Commercial Company not having petitioned against the present Bill, nor the Bill of 1864; question hereon as to the willingness of the company to take the risk of explosions, *R. Jones* 1620–1625. 1673–1675.——*See* also *Millwall Dock Subway.*

Committee of Investigation (1857). Appointment by the Metropolitan Board of a committee comprising several engineers of eminence for considering certain designs for subways in 1857, and for awarding prizes, *Bazalgette* 368–386——Full inquiry made by the committee of investigation in regard to the mode of laying the pipes, and the detailed arrangements generally, *ib.* 390–394.——*See* also *Designs for Subways.*

Communication Pipes. See *Service Pipes.*

Compulsory Powers. Opinion that a compulsion upon the companies to lay pipes in the subways, and to pay rent, would have no effect whatever in increasing the price to consumers, *Boulnois* 1293–1297——Objections to the companies being compelled not only to use the subways but to pay a rent for doing so, *Greaves* 2998–3000. 3130–3135. *Brothers* 4669; *Hersey* 5254–5258. 5269–5277——Expediency of satisfactory experiments being made before compulsory powers are given as to the use of subways, *Percy* 4682.

Connection of Pipes. See *Jointing of Pipes.*

Constitution of Committee. Protest on the part of the gas and water companies against the constitution of the Committee, the chairman being a member of the Metropolitan Board, by whom the Bill is promoted, *Rep.* 3.

COST:

1. *As to the Cost of Subways.*
2. *As to the Cost of Maintenance.*
3. *As to the Cost of Laying and Repairing Pipes.*
4. *As to the Cost of Removal of Pipes.*

1. *As to the Cost of Subways:*

Average of 2 *l.* 15 *s.* per foot as the cost of the Garrick-street subway, *Bazalgette* 486——The cost of the Southwark-street subway was about 3 *l.* a foot, or a little more——The cost of the Thames Embankment subway has not been estimated, *ib.* 487——Greater cheapness comparatively of large subways in which a great number of pipes are laid, *ib.* 2817–2820. 2876, 2877.

Enormous cost to be incurred in putting subways into the leading thoroughfares of the metropolis, *Simpson* 4109, 4110——Immense expense involved in any large extension of subways, *Brothers* 4596.

2. *As to the Cost of Maintenance:*

Contemplated maintenance of the subways by the parties in whose interest they are constructed, *Greaves* 312——Opinion that the companies should pay for the maintenance of the subways and the supervision of the works and pipes, *Bazalgette* 703.

Clause proposed on the part of the Metropolitan Board, and objected to on the part of the gas and water companies, in regard to the maintenance of the subways in an efficient state of ventilation and repair, *Ev.* p. 320.

3. *As to the Cost of Laying and Repairing Pipes:*

Conclusion that the expense of laying pipes must necessarily be much reduced by the use of subways, *Bazalgette* 434–437——Probability of some increase of expense in the case of large pipes by laying them in subways, *Hemans* 845–847——Saving to the water companies by the use of subways, *Boulnois* 1216, 1217——Conclusion as to its being less expensive to lay pipes in subways than in streets; data for such conclusion, considered, *ib.* 1243–1252. 1291, 1292. 1316–1320——Opinion that the first cost of laying mains would be less in subways than in streets, *Evans* 1451, 1452——Very little, if any, expense involved in keeping up pipes and mains when once they have been properly laid, and the repaving has been completed, *ib.* 1526–1530.

Total of 5 *s.* 3½ *d.* as the whole cost per yard of laying the 18-inch gas main in Southwark-street subway, including wooden piers, *R. Jones* 1584–1595. 1664, 1665——Much greater cost in laying an 18-inch main in a street than in a subway, *ib.* 1588–1590——Great saving of cost by laying pipes in subways, chiefly through the economy of labour, *H. E. Jones* 1760–1763. 1790.——Greater cost estimated by witness than by his father, for chairs or supports for the pipes; concurrence otherwise in their estimate of the saving to be effected, *ib.* 1785–1799.

COST—continued.

3. *As to the Cost of Laying and Repairing Pipes*—continued.

Much smaller price for which witness would guarantee to lay water and gas pipes in a subway than in a street; examination in support of this statement, *Easton* 1956–1960. 1995–2014. 2035. 2060–2066——Limited experience hitherto in regard to the laying of gas pipes in subways, *ib.* 1989–1994.

Cost of 65 *l.* in laying the New River Company's pipe in the Garrick-street subway, whilst it was calculated that for 56 *l.* it could have been laid in the street, *Muir* 2373–2380. 2492–2507——Several sources of expense in laying and maintaining pipes in subways, which do not now arise, *ib.* 2377–2380. 2384, 2385. 2579–2581——Cost involved in the use of artificial light, and in constant inspection, *ib.* 2379. 2384——Dissent from the evidence of Mr. Easton, as to the prices at which pipes may be laid in subways, *ib.* 2520–2534.

Impression that the expense of repairs would, on the whole, be greater in the subway than in the open ground, *Greaves* 2989-2991——Difficulty in forming any definite estimate of the first cost of laying pipes in subways, *ib.* 2996. 3043–3045——Greater expense of laying water mains in subways than in streets, *Bateman* 3398–3404——Equal expense in laying pipes in subways as in streets, *Hawksley* 3689.

Data for concluding that the cost of laying pipes was greater in the Garrick-street subway than in the streets, *Brothers* 4646–4655——Dissent from the statements of Mr. Jones and Mr. Easton as to the cost of laying pipes in subways and in streets respectively, *Hersey* 5223–5226——Serious expense in getting large pipes into subways, and in laying them if the subways are already tolerably full of pipes, *ib.* 5232, 5233——Opinion that the use of subways would not cause any saving in the maintenance of the pipes, *ib.* 5259.

4. *As to the Cost of Removal of Pipes:*

Expense necessary for duplicate pipes if the existing pipes were to be removed into subways, *Muir* 2458, 2459——Great expense of removing existing pipes into subways, so that in the case of the smaller pipes it would be better to abandon them, *Greaves* 2997. 3139–3148——Expediency of the Metropolitan Board being at the expense of relaying the pipes, if the companies are compelled to enter the subways, *Brothers* 4598. 4604–4606. 4609–4618. 4659, 4660. 4668.

Provision suggested by the Committee, that the cost of removing the pipes from any existing street into the subways be defrayed by the Metropolitan Board, *Ev. p.* 319.

See also *Arbitration. Bent Pipes. Explosions,* 6. *Rates. Rent. Size of Subways.*

Covent Garden Subway. See *Garrick-street Subway.*

D.

Danger. See *Explosions.*

Designs for Subways. Appointment by the Metropolitan Board of a committee, comprising several engineers of eminence, for considering certain designs for subways in 1857, and for awarding prizes, *Bazalgette* 368–386——Modifications introduced by the Board before adopting any of the plans for subways which were submitted to the committee of investigation, *ib.* 384–386.

Witness was formerly superintending architect to the Metropolitan Board of Works, and assisted in preparing the orginal designs for the subways, *Marrable* 1698, 1699.

Explanation that witness, as one of the judges, concurred generally in the report by which the prizes were awarded, but that such report never touched upon the question whether subways were suitable or desirable at all for the laying of gas and water pipes, *Hawksley* 3648. 3662, 3663——Examination in defence of the course taken by witness as one of the committee appointed to adjudge prizes for the best designs for subways in the metropolis; denial that it was the duty of witness to express any condemnation of subways generally, *ib.* 3837–3859. 3913–3915. 3923–3932.

Districting Arrangement (*Gas Companies*). Consideration of the effect of the districting arrangement in reference to the number of gas pipes to be required in a subway in Cheapside, or any other leading thoroughfare, *Muir* 2475–2491.

Disturbance of Pipes. Constant disturbance of the pipes as at present laid; much less liability to disturbance if laid in subways, *Bazalgette* 431; *Pole* 1355, 1356——Advantage of the non-liability of gas mains in subways to constant disturbance, *Evans* 1450——Experience of some thirteen years with some gas pipes at witness's works, some of them in a short subway, during which period no leakage has ever occurred, the pipes never having been disturbed, *R. Jones* 1607–1613. 1670, 1671——Very rare disturbance of gas mains when once laid down in the streets, *Innes* 4374——*See* also *Vibration.*

Durability of Pipes. Facility in subways of coating the pipes with bitumen or other material for preventing oxidation and decay, *Tarbotton* 74, 75——Freedom from corrosion of pipes in subways, *Bramwell* 1013, 1014——Less corrosion of pipes in subways than in the streets, *Pole* 1379.

Doubt as to any greater liability of pipes to corrosion and decay in the streets than in subways, *Greaves* 3030–3035——Liability of pipes to decay entirely from external rust; difficulty in preventing this, *ib.* 3164–3167.

E.

East London Waterworks Company. Large extent of the district supplied by the East London Company, the total length of the pipes being about 475 miles, and there being about 300 miles of streets supplied, *Greaves* 2912–2921.

Easton, Edward. (Analysis of his Evidence.)—Partner in the firm of Easton & Amos; has had extensive experience in the laying of water pipes and gas pipes, 1940, 1941. 1957——Has examined the subways in Southwark-street and Garrick-street, and sees no difficulty in laying pipes in them, 1942–1944——Particulars relative to the laying of water pipes in the subway at Rouen by witness's firm; successful manner in which carried out, notwithstanding the smallness of the subway, 1945–1955. 1972–1988——Much smaller price for which witness would guarantee to lay water and gas pipes in a subway than in a street; examination in support of this statement, 1956–1960. 1995–2014. 2035. 2060–2066.

Experimental laying of some water pipes by witness in Southwark-street subway; unfavourable circumstances under which this was done, 1956. 2015–2019——Willingness of the workmen to enter the subways, without fear of any danger in laying the pipes or making joints, 1961. 2033——Facility of carrying on the work in subways without candles, ample light being obtained by the use of reflectors, 1962–1964. 2032–2034.

Calculation to the effect that the bursting of a water main in the Southwark-stree subway could not inundate the place so quickly as to cause the slightest danger to men at work, 1965–1970——Suggestion as to the brick pier necessary for the support of the pipes, 1971——Circumstance of the gas pipes in Rouen not being laid in the subway, 1973–1980——Limited experience hitherto in regard to the laying of gas pipes in subways, 1989–1994.

Further statement as to the means of lighting the subways, so as to dispense with candles and to meet the objections needlessly made on this score by the opponents of the Bill, 2020–2024. 2034——Way in which molten lead could be provided for making the joints, without having a fire in the subways, 2025–2033——With regard to the payment of rent for the use of the subways, this would be covered by the saving in not breaking up and repaving the streets, 2036.

Probability of a 48-inch water main and a 48-inch or 36-inch gas main being required in a subway in a leading thoroughfare; probable requirement also of an 18-inch district main and a 6-inch service main, 2037–2040——Statement as to the great inconvenience caused to the public and the great injury to the paving by the breaking up of the Southwark-street for the laying of gas and water mains, 2041–2059.

Way in which the large and numerous pipes in such a thoroughfare as the Strand might be removed or diverted without any insuperable impediment to the formation of a subway, and the laying of the pipes, 2066–2075——Decided approval of a subway in old streets like the Strand, 2066–2068——Means of carrying on the gas and water services during the formation of the subways, and pending the laying of permanent pipes in lieu of those removed, 2069–2075——Advantage of circular pipes over square or oval pipes, 2076, 2077.

Engineers (Gas Companies). Admission as to the great majority of the gas engineers in London being opposed to subways, *Evans* 1470–1472.

Enlargement of Subways. Probable necessity, after the lapse of many years, of enlarging the subways, *Hemans* 908–916——Great interference with the traffic if it were necessary to enlarge a subway already formed, *Greaves* 3005–3007.

Entrances to Subways. Side entrance through which the mains were taken into the subway in Southwark-street, *Bazalgette* 735——Great facility in introducing large pipes into subways irrespectively of the expense, *Hemans* 848, 849——Absence of difficulty in getting the mains into the subways by making the openings large enough, *Bramwell* 1034, 1035——Facility in carrying the larger pipes down the side entrance into the subway in Southwark-street, *H. E. Jones* 1920–1923——Ample provision made by witness's plan for getting large mains into the proposed central gallery of each subway, *Bazalgette* 2821–2827.

Absence of any great facility in letting down large pipes into subways through openings for the purpose, *Greaves* 3111–3115——Very great difficulty in getting heavy pipes into subways and in conveying them along inside; advantage on the latter score if there were

Entrances to Subways—continued.

were tramways inside, *Bateman* 3442–3447——Inadequate size of the openings in the Southwark-street subway for the admission of a 24-inch pipe, *Innes* 4308, 4309.

Equitable Gas Company. Leakage experienced in the case of some mains and pipes in a covered way at the works of the Equitable Company, *Brothers* 4532.

See also *Garrick-street Subway*, 6.

Evans, Frederick John. (Analysis of his Evidence.)—Is Engineer of the Chartered Gas Company, 1443——Considers that it is much safer to lay gas mains in subways than in the streets, 1445, 1446. 1450——Subways are still safer for water mains than for gas mains, 1447, 1448——Advantage of the non-liability of gas mains in subways to constant disturbance, 1450——Opinion that the first cost of laying mains would be less in subways than in streets, 1451, 1452——Facility of arranging the pipes in subways and of making the connections, 1453–1455——Advantage in the service pipes being laid at the same time as the mains, 1456, 1457.

Occurrence of several explosions in connection with the Chartered Company, which would not have happened if the pipes were in subways, 1458–1460. 1479–1483——Conclusion as to the limited damage to be done by an explosion in a subway; result of experiments made by witness on this point, 1461–1468. 1477, 1478——Illustration of the tendency of gas to ascend, so that it would escape through any openings in the subways without causing an explosion, 1464. 1489——Circumstance of witness's company having applied for power to lay pipes in the Thames Embankment subway; many of the directors are, however, apprehensive of danger by the use of subways, though witness would gladly avail himself of them, 1465. 1469–1476. 1504–1513.

Admission as to the great majority of gas engineers in London being opposed to the use of subways, 1470–1472——Reference to an explosion in Leicester-square, as having happened in a house, so that the question of subways does not apply in this case, 1481–1483. 1534–1538—— Question as to the companies paying a rent for the subwsys in return for the advantages to be gained; witness cannot give any specific opinion on this point, 1484–1488 ——Examination upon the question whether the Metropolitan Board or the gas companies should be responsible for injuries caused by explosions, 1490–1497. 1504–1517

Opinion further expressed as to the facility of guarding against gas explosions in subways; the risk would in fact be reduced to a minimum, 1490–1493. 1498–1503——Petition by witness's company against the present Bill, on account chiefly of the apprehension of some great explosions arising, 1504–1513. 1532, 1533——Considerable saving by the laying of gas pipes in subways, so that there would be a margin available for rent, 1518–1525——Very little, if any, expense involved in keeping up pipes and mains when once they have been properly laid, and the repaving has been completed, 1526–1530.

Experiments. Opinion as to the sufficiency of the experiment applied by witness to 144 yards of pipes in the Southwark-street subway, in order to prove the greater tightness of pipes laid in subways than in streets, *H. E. Jones* 1815–1827. 1849–1851.

Expediency of satisfactory experiments being made before compulsory powers are given as to the use of the subways, *Percy* 4680–4684——Actual points to be determined by the proposed experiments; opinion that they would meet most cases of leakage that might arise, *ib.* 4695–4703——Further suggestions as to the mode in which the proposed experiments should be conducted; expediency of Mr. Ansell being present with his apparatus, *ib.* 4708–4715.

Unsatisfactory test afforded, unless sufficient gas be allowed to escape for the formation of an explosive mixture, *Odling* 5171, 5172. 5175–5179. 5187, 5188.

See also *Garrick-street Subway.* *Southwark-street Subway*, 8. 10.

EXPLOSIONS:

1. *Conclusions favourable to Subways for Gas Pipes, as regards Exemption from Explosions.*
2. *Conclusions adverse to Subways, on account of the risk of Explosions.*
3. *Question considered as to the tendency of Gas Leakages to escape through the Roof, or to form an Explosive Compound in the Subway.*
4. *Probable Effect of an Explosion in a Subway.*
5. *Occurrence of Explosions in Sewers and Cellars, under the present system of Laying Gas Pipes.*
6. *Question as to the Responsibility for Explosions resting with the Companies, or with the Metropolitan Board.*

EXPLOSIONS—continued.

1. *Conclusions favourable to Subways for Gas Pipes, as regards Exemption from Explosions:*

Sufficiency of the ventilation for carrying off any leakage of gas, so that explosions need not be feared, *Tarbotton* 79, 80——Belief that danger from gas escapes in a subway, would be reduced to a minimum, *Bazalgette* 432——Impossibility of an explosion in subways, if the ventilation is complete, *Hemans* 965–969. 979–983.

Admissions that explosions of gas may probably never be avoided, even in subways, *Bramwell* 1071–1075——Doubt as to explosions in subways being likely to arise from carelessness on the part of workmen, *ib.* 1084–1101. 1116–1126——Great improbability of wilful explosions in subways in the event of public disturbances, *ib.* 1102–1107. 1137 ——Belief that subways would reduce the probability of explosions to a minimum, *ib.* 1127, 1128.

Less danger by the use of subways, as the pipes would be more accurately laid and leakage would be readily detected, *Boulnois* 1233, 1234——Extremely slight chance of explosions in subways, *Pole* 1374–1378——Witness considers that it is much safer to lay gas mains in subways than in streets, *Evans* 1445, 1446. 1450——Opinion further expressed as to the facility of guarding against gas explosions in subways, the risk would in fact be reduced to a minimum, *ib.* 1490–1493. 1498–1503.

Expediency of not entering a subway with a naked candle when a leakage had been going on, *R. Jones* 1614–1618——Absence of danger from men smoking in a subway, *H. E. Jones* 1783, 1784——Belief that, by proper care, gas leakages which lead to explosions may be entirely stopped in subways, *ib.* 1834–1840——Opinion that it is far safer to lay gas mains in subways than in streets, *Upward* 2141, 2142.

Safety of gas pipes in subways generally, if care be taken in laying them, *Frankland* 2166. 2172——Facility of meeting any objection in regard to the risk of explosion in the side galleries, *Bazalgette* 2886–2894——Admission that, with proper control and constan supervsion, the danger of subways may be reduced to a minimum, *Greaves* 3097–3101.

Witness believes it to be quite feasible and safe to lay gas and water mains in subways, *Percy* 4677, 4678——Great improbability of any contingency leading to a large escape of gas in any subway, whilst at the same time the means of ventilation were inoperative, *Frankland* 4891. 4899–4901——Witness repeats that he sees no danger in placing gas pipes in subways, if fair precautions be taken in laying the pipes, and if proper supervision be subsequently exercised, *ib.* 4924–4935——Conclusion as to the safety of subways for gas pipes, unless some unforeseen contingencies should arise, *Campbell* 4974–4979.

2. *Conclusions adverse to Subways, on account of the risk of Explosions:*

Grounds for concluding that using subways for gas mains would be attended with much danger, on account of the risk of explosion, *Bateman* 3405 *et seq.*——Liability to explosions in subways as in mines, even though every precaution be taken, *ib.* 3569–3574 ——Increased danger of explosions where there are galleries for the gas services, *Bateman* 3599, 3600; *Hawksley* 3740–3744; *Woodhouse* 3939–3941. 3951–3954. 3969–3977; *Simpson* 4067.

Great danger in using subways in London for gas pipes, *Hawksley* 3630——Numerous ways in which an accident or explosion may be caused in the laying or altering of the various pipes; sooner or later accidents would, in fact, be inevitable, *ib.* 3674–3676—— Insufficiency, in certain states of the atmosphere, of openings in the roof for causing the escape of explosive mixture, *ib.* 3738–3740. 3747——Conclusion further expressed as to the inadequacy of the means of ventilation hitherto adopted in the London subways for carrying off explosive mixtures, *ib.* 3776, 3777——Very little danger of explosion from ordinary leakages of gas in subways, *ib.* 3777, 3778——Apprehension of serious accidents and explosions chiefly from casualities to the pipes and sudden escapes of gas, *ib.* 3778, 3779.

Probability of explosions of gas in the subways in the present imperfect state of the ventilation, *Woodhouse* 3938, 3939——Readiness of witness to encourage the laying of water and gas pipes in subways, but for the expense and the liability to explosions, *Simpson* 4014–4022——Obstacle to entering the subways when accumulations of gas are discovered, *ib.* 4101–4103.

Certainty of explosion from a leakage in a subway, if it go on long enough, and if artificial lights be used, *Innes* 4328——Conclusion as to the failure involved in subways; several instances of leakages and explosions in existing subways or covered passages adverted to hereon, *ib.* 4375–4380——Several respects in which there is greater liability to accident in laying the mains and making alterations and repairs in subways than in streets, *Brothers* 4543–4547. 4549–4554.

EXPLOSIONS—continued.

3. *Question considered as to the tendency of Gas Leakages to escape through the Roof, or to form an Explosive Compound in the Subway:*

Consideration of the probabilities of gas leakages rising through the atmosphere in subways and escaping through the openings without rendering the air explosive, *Bazalgette* 736–765——Increased tendency of the gas to escape from the subways accordingly as the atmosphere is more dense, *Hemans* 876–880. 982, 983——Relative proportions of gas and of atmospheric air which form an explosive mixture, *ib.* 963–966——Tendency of a dense atmosphere in the subway to cause any gas leakage to ascend to the openings, *Bramwell* 1070——Explosive compound formed in time if the leakage go on without there being any escape, *ib.* 1175, 1176.

Statement as to the tendency of gas leakages to rise to the roof of the subway and to escape through the openings, instead of mixing with the atmosphere until an explosive compound is formed, *Pole* 1409–1416. 1421–1423. 1426–1430. 1438–1442——Escape of the gas through the openings even if there were no current or draught created by the ventilation, *ib.* 1413–1416. 1421–1423. 1426–1430. 1438–1442——The gas could not accumulate in the lateral openings, *ib.* 1414.

Illustration of the tendency of gas to ascend so that it would escape through any openings in the subways without causing an explosion, *Evans* 1464–1489——Danger of explosion when the mixture of gas and of air is as 1 to 9 or 10, *R. Jones* 1619——Liability to explosion by an admixture of gas with air in the proportion of about one-tenth of the former, *H. E. Jones* 1928–1935——Tendency of carburretted hydrogen to ascend through the atmospheric air though it mixes with the atmosphere more or less, *ib.* 1936–1939.

Cross-examination upon the argument that gas leakages in a subway, though having a tendency to ascend through the air, will yet so diffuse itself as gradually to form an explosive mixture instead of escaping through openings in the roof: experience on which this conclusion is founded, *Forster* 2653 *et seq.*——Tendency of gas leakage in a subway to collect until an explosive mixture is formed, *Greaves* 2966–2970——Question as to the danger arising from applying a light to a jet of gas escaping in a subway, *ib.* 3017–3022.

Tendency of gas escaping in subways to mix itself with the air until it forms an explosive mixture, *Bateman* 3408. 3417–3423——Statement in support of the view that when the atmosphere in subways, &c. is heavy or sluggish, gas will not rise through it, but will accumulate and become liable to explosion, *Simpson* 4039–4051——Dissent from the opinion of Mr. Bramwell as to gas leakages always rising through the atmosphere and escaping through openings in the roof, *ib.* 4227–4232——Tendency of gas in a subway to diffuse itself as well as to ascend through the air, so that an explosive mixture would be formed, *Innes* 4342–4348.

Tendency of gas to rise through the air though to some extent diffusion takes place, *Percy* 4688–4692——The lowest explosive mixture is about 6 per cent. of gas, *Frankland* 4772. 4902, 4903.

Tendency of gas escaping through a subway to diffuse itself but not very quickly, *Letheby* 5098–5100——Way in which there might be an explosive mixture in some parts of any subway without the whole subway being filled with the mixture, *Odling* 5180–5182.

4. *Probable Effect of an Explosion in a Subway:*

Doubt as to an explosion in a subway having any very disastrous effect: result of the Paris explosions adverted to hereon, *Bazalgette* 738–746. 750–753——Great improbability of any such accumulation of explosive mixture as to lead to the blowing up of a whole street, *Hemans* 899–901. 965–967——Statement to the effect that an explosion in a subway would not be so great as some explosions that have occurred in sewers from gas leakages, *Bramwell* 1076–1083——Grounds for concluding that an explosion in a subway would not be a very serious matter, *Boulnois* 1238, 1239. 1266–1270. 1282–1284.

Reasons for concluding that an explosion in a subway would not cause much damage, *Pole* 1375–1378. 1417–1420——Conclusion as to the limited damage to be done by an explosion in a subway: result of experiments made by witness on this point, *Evans* 1461–1468. 1477, 1478.

Explanation as to the relative proportion of gas and of atmospheric air which produce an explosive mixture, and as to the probable effect or power of gas explosions in subways, *Frankland* 2175–2180. 2198–2204. 2215–2244——Probability of a serious explosion if there were an accumulation of gas from the breakage of a main or from its being left open at the end, and if at the same time a workman were to hold a candle up to the crown of the arch: great improbability however of any such contingencies occurring, *ib.* 2194–2197. 2208–2230.

EXPLOSIONS—continued.

4. *Probable Effect of an Explosion in a Subway*—continued.

Apprehension lest terrific explosions might sometimes be caused, but for which witness would approve of subways for gas and water pipes, the question of cost being a secondary consideration, *Muir* 2546-2552——Belief as to the great damage to be caused by explosions in subways, *Forster* 2637-2640.

Enormous amount of damage which might be caused by an explosion in a subway, whilst witness sees nothing to justify such risk, *Bateman*, 3433-3438—— The whole street above the subway might possibly be blown up, *ib.* 3434——Probability of the street being blown up by an explosion, and of there being much loss of life, *Hawksley* 3674. 3676, 3677.

Dissent from the view that an explosion in a subway would be a terrific one, *Percy* 4693, 4694.

5. *Occurrence of Explosions in Sewers and Cellars, under the present System of laying Gas Pipes:*

Conclusion as to the liability to explosions from leakages into the sewers under the present system of laying gas-pipes, *Hemans* 891-898——Several instances of explosions from leakages of gas under the present system of laying the pipes, *ib.* 947-953; *Bramwell* 1061-1064——Conclusion that under the present system gas leakages are not entirely absorbed in the earth, and that the danger of explosion is in consequence greater than if leakages occurred in a subway, *ib.* 1152-1161——Occurrence of several explosions in connection with the Chartered Company, which would not have happened if the pipes were in subways, *Evans* 1458-1460. 1479-1483——Great contamination of the soil under the present system whilst the danger of explosions is greater than if subways were used, *Frankland* 2167-2174.

Explanation in connection with a return showing numerous instances of explosions and of personal injuries through gas leaking from the soil into the sewers; prevention of these accidents by a general use of subways, *Bazalgette* 2849-2871——Occurrence of several explosions in sewers since 1861, *ib.* 2901, 2902.

Frequent explosions some years ago in vaults or cellars in Parliament-street into which gas had leaked, *Simpson* 4040-4051——Frequent explosions in sewers through gas leaking in from the soil through the brickwork, *ib.* 4058-4060——Several explosions of gas within witness's experience in cellars and drains; inference as to these equally occurring in subways, *Innes* 4351-4358——Occurrence of an explosion in a gallery or covered way under a house at Greenwich, *ib.* 4405-4408——Admission as to leakages and explosions being unavoidable under the present system of laying gas-pipes, the companies being pecuniarily liable, *ib.* 4482-4491.

Comparative harmlessness of escapes and explosions under the present system, so that it is very imprudent to run the risk of subways, *Brothers* 4582-4587——Liability to explosions in sewers adverted to in support of the conclusion as to the danger of serious explosions in subways, *Hersey* 5262-5268.

Paper submitted by Mr. Bazalgette, containing a list of several gas explosions in sewers, &c. since the year 1831, together with correspondence and statements in explanation, *App.* 327-332.

6. *Question as to the Responsibility for Explosions resting with the Companies or with the Metropolitan Board:*

Justification of the indemnity offered at Nottingham to the Gas Company by the Corporation, though generally the responsibility should rest upon the companies if they lay the pipes and continue in charge of them, *Tarbotton* 315-328——Belief as to an indemnity being altogether unnecessary on account of the absence practically of all danger if the pipes are properly laid, *ib.* 320. 325-329.

Examination upon the question whether the Metropolitan Board or the Gas Companies should be responsible for injuries caused by explosions, *Evans* 1490-1497. 1504-1517——Willingness of the companies to use subways generally, but for the difficulties and the risk, *Muir* 2540-2541. 2546——Illustration in the case of an injury to the pipes of the New River Company, through an accident at the Fleet-street sewer, of the great difficulty of fixing the liability with reference to accidents in subways, *ib.* 2553-2571. 2582-2593.

Opinion that the subways being under the control of the Metropolitan Board the latter should be responsible for any accidents to the mains, *Bateman* 3439-3441——The Metropolitan Board should be responsible for accidents; difficulty, otherwise, in fixing the responsibility, *Brothers* 4598-4603——Further statement as to the difficulty of fixing upon one company the responsibility for an explosion in a subway through which there are several pipes, *ib.* 4619, 4620. 4661-4667.

Opinion that the Metropolitan Board may, with perfect safety, take upon itself the responsibility for explosions, *Ansell* 5084.

Explosions—continued.

6. *Question as to the Responsibility for Explosions, &c.*—continued.

Expediency of the Metropolitan Board bearing the responsibility of explosions if the use of subways be made compulsory, *Hersey* 5247, 5248——Failure, generally, of the Imperial Gas Company in resisting actions for damages from explosions, *ib.* 5247–5253.

Clause proposed on the part of the Gas and Water Companies providing for responsibility on the part of the Metropolitan Board with regard to the efficiency and freedom from danger of the subways; objections thereto on the part of the Board, *Ev. p.* 320.

See also *Church-street, Shoreditch.* *Garrick-street Subway*, 6. *Gas Pipes. Glasgow. Inspection. Jointing of Pipes. Leakage of Gas. Nottingham. Oxford-street Explosion* (1863). *Paris. Phœnix Gas Company. Safety Lamps. Southwark-street Subway*, 8. 10. *Supervision. Ventilation. Westmoreland-street Explosion.*

F.

Fire Plugs. See *Openings in the Streets.* *Valves and Hydrants.*

Forster, Thomas Everson. (Analysis of his Evidence.)—Is President of the North of England Institute of Engineers; has had a very lengthened and wide experience as a mining engineer, 2594–2601——Recent inspection by witness of the subway near Covent Garden, the result being that there was no ventilation whatever in it, nor are the small openings capable of giving any ventilation, 2602–2636. 2651, 2652. 2707–2724——Conclusion as to the great danger of a leakage of gas in the subway, witness contending that the gas would mix with the atmosphere until an explosive compound was formed, 2617–2628. 2653 *et seq.*

Belief as to the great damage to be caused by explosions in subways, 2637–2640——Necessity of artificial ventilation, as by means of a furnace, with a downcast and upcast shaft, in order to keep the subway free from gas, 2641–2650. 2688–2698——Artificial ventilation found necessary in the case of coal mines; explosions, however, frequently occurring notwithstanding the care taken, 2641–2643. 2690. 2752–2757——Entire absence of ventilation in the side galleries of the Covent Garden subway, 2647, 2648.

Cross-examination upon the argument that gas leakage in a subway, though having a tendency to ascend through the air, will yet so diffuse itself as gradually to form an explosive mixture, instead of escaping through openings in the roof; experience on which this conclusion is founded, 2653 *et seq.*

Frankland, Dr. Edward. (Analysis of his Evidence.)—Professor of Chemistry; has made numerous experiments in connection with gas, 2148–2150——Careful experiments recently made by witness upon the subject of gas leakage in the Southwark-street subway; exceedingly slight leakage even though a very high pressure was put on, 2151–2159. 2181–2189——Conclusion that the escape proceeded entirely from the joints, and that there is not any leakage of gas through the pipes themselves, 2160–2165. 2183–2187. 2205——Sufficiency of the ventilation in the subway to carry off 100 times the present amount of leakage, so that no fear of explosion need be apprehended, 2163–2166.

Safety of gas pipes in subways, generally, if care be taken in laying them, 2166. 2172——Great contamination of the soil under the present system, whilst the danger of explosion is greater than if subways were used, 2167–2174——Explanation as to the relative proportions of gas and of atmospheric air, which produce an explosive mixture, and as to the probable effect or power of gas explosions in subways, 2175–2180. 2198–2204. 2215–2244.

Tendency of any gas escaping from the pipes to rise through the atmosphere; entire adequacy of the openings provided in such case in the Southwark-street subway, 2190–2193. 2206–2209. 2229–2237——Probability of a serious explosion if there were an accumulation of gas, from the breakage of a main, or from its being left open at the end, and if at the same time a workman were to hold a candle up to the crown of the arch; great improbability, however, of any such contingencies occurring, 2194–2197. 2208–2230——Advantage of ventilators in the crown of the arch of any subway, rather than of ventilating shafts, 2233, 2234.

[Second Examination.]—Consultation of Dr. Percy by witness before commencing some recent experiments in the Southwark-street subway in regard to the effect of escapes of gas, 4716–4718——Several persons present at the first experiments, made on Saturday the 6th July, 4719–4722——Openings of 3-16ths of an inch, and of 5-8ths of an inch, made in the main on Saturday, in order to ascertain the per-centage of gas in the crown of the subway; the result being that at the end of fifteen minutes the proportion of gas near the crown of the arch was never more than 2½ per cent., 4723–4740. 4748, 4749——Down draught in some of the ventilators, and up draught in others, during the

Frankland, Dr. Edward. (Analysis of his Evidence)—*continued.*

experiments on 6th July, the gas sometimes going out by one ventilator and sometimes by another, 4741–4747.

Mention of the several persons present at the further experiments in Southwark-street subway, on Monday the 8th July; Dr. Percy was unable to attend any of the experiments, 4750–4761. 4794–4800——Opening of 3-8ths of an inch first made in an 18-inch gas main, on 8th July, the maximum per-centage of gas at the crown of the arch having been 3 per cent. at any time during fifteen minutes, 4762, 4763——Lighting of a match in the subway, and also of the jet of gas from the opening in the main, without any risk of explosion having been experienced, 4764, 4765——Subsequent opening made of an inch-and-a-half in diameter, a light having also been applied, without any tendency to explosion, 4766–4772.

Further experiments on 8th July, by making two apertures, each one-inch-and-a-half in diameter, from the two mains on opposite sides of the subways; maximum of 3 per cent. of gas found on this occasion between the ventilators, whilst a light was applied to one of the jets without the other igniting from it, 4772–4774——Escape of the gas through the ventilators as quickly as it came from the main, there having been no increased proportion in the subway after the draught through the roof had established itself, 4775–4786——Conclusion of the experiments, by admitting into the subway all the gas that could be obtained from each pipe, 4787–4790——Confirmation of witness's confidence in the safety of subways by the experiments in question, 4801–4803.

Examination as to the probable per-centage of gas near the pipe, or in other parts of the subway, when the amount was 2½ or 3 per cent. near the ventilators, 4804–4833. 4845, 4846——Different modes in which the gas was allowed to escape from the pipe at the different experiments, 4834–4838——Question as to the effect of lighting the jet from the pipe in warming the subway, and in causing an artificial increase of ventilation, 4839–4856. 4870–4872.

Due instructions received from Dr. Percy before making the experiments; nothing was said about making holes in the side passages, 4857, 4858——Closing practically of the apertures in the side galleries at the time of the experiments, 4861–4865——Little, if any, gas at the bottom of the subway when the escape was going on; there was not in fact much diffusion, 4866–4869. 4892–4895. 4915——Slight effect of lighting the jet upon the heat or the ventilation, 4870–4872——Effect respectively of an escape from a small aperture in the pipe, and from a large aperture as regards diffusion through the subway, or ready ascent to the roof, 4873–4882.

Conclusion as to escapes of gas not lodging in the side galleries, 4883–4887——Inability of witness to state the quantity of gas emitted from the holes made in the pipes in the Southwark-street subway, 4888–4890——Great improbability of any contingency leading to a large escape of gas in any subway, whilst at the same time the means of ventilation were inoperative, 4891. 4899–4901——Unfavourable state of the atmosphere on the days of the recent experiments, 4898. 4916.

Expected melting of any snow falling on the ventilators on account of the warmth of the atmosphere below, 4899–4901——Expediency of its being the duty of some authority to see that the ventilators were kept clear, 4901——Necessity of double the maximum per-centage of gas that was formed during the experiments, in order to form an explosive mixture, 4902, 4903——Conclusion that the per-centage of gas in the subway would not increase with a prolonged escape from the pipe, unless some of the ventilators were closed, 4904–4906.

Opinion that the present ventilation of the Southwark-street subway is sufficient, 4907, 4908. 4914——Approval of openings in the roof rather than of a current of air being established by artificial ventilation, 4910——Increased safety if there were an opening at the summit of each of the side galleries, 4911–4914——Upward draught through the ventilators formerly in the subway upon a certain occasion when witness tested them; the entrance door was probably open at the time, 4917–4921——Facility of keeping the temperature in summer up to the heat outside, 4922, 4923.

Witness repeats that he sees no danger in placing gas pipes in subways if fair precautions be taken in laying the pipes, and if proper supervision be subsequently exercised, 4924–4935——Much less liability to accidental leakage in subways than in streets, 4927——Facility by means of Mr. Ansell's apparatus of at once detecting any leakage in a subway, 4935.

Frost. See *Temperature. Water Pipes.*

G.

GARRICK STREET SUBWAY:

1. *Due Investigation and Inquiry before the Construction of the Subway.*
2. *Dimensions and Mode of Construction.*
3. *Cost.*
4. *Ventilation: Question as to its Efficiency.*
5. *Inspection.*
6. *Use of the Subway for Gas and Water-pipes: Character of the Experience derived therefrom.*

1. *Due Investigation and Inquiry before the Construction of the Subway:*

Very careful investigation by the Metropolitan Board upon which they decided to construct a subway in connection with Garrick-street, Covent Garden, *Bazalgette* 367——Premiums were first offered for the best designs for subways, and eminent engineers were appointed to examine the plans and to award prizes, *ib.* 367–386.

2. *Dimensions and Mode of Construction:*

Construction of the subway in 1861, the height being six feet six inches and the width at the base thirteen feet, *Bazalgette* 387——Passage at every second house from the subway to the wall of the cellar of the house through which the pipe is taken into the house, *ib.* 387. 399–402——Formation of a sewer underneath the subway; varying depth between the two, *ib.* 387–389.

3. *Cost:*

Average of 2 *l.* 15 *s.* per foot as the cost of the Garrick-street subway, *Bazalgette* 486.

4. *Ventilation: Question as to its Efficiency:*

The openings are eighty feet apart, *Bazalgette* 387. 441——Conclusion as to the adequacy of the ventilation, *Boulnois* 1240, 1241; *Pole* 1370, 1371——Vertical openings into the roadways by which the subway is ventilated; theirsufficiency, *Marrable* 1709–1715.

Variable ventilation in the Garrick-street subway, *Muir* 2441–2444——Want of ventilation of the side passages in the subway, *ib.* 2456, 2457——Recent inspection by witness of the subway near Covent Garden; the result being that there was no ventilation whatever in it, nor are the small openings capable of giving any ventilation, *Forster* 2602–2639. 2651, 2552. 2707–2724——Conclusion as to the great danger of a leakage of gas in the subway, witness contending that the gas would mix with the atmosphere until an explosive compound was formed, *ib.* 2617–2628. 2635 *et seq.*——Entire absence of ventilation in the side galleries, *ib.* 2647, 2648.

Openings can easily be placed in the side passages, *Bazalgette* 2900——Belief as to the adequacy of the ventilation even though a constant current of air through the openings may not be provided, *ib.* 2903–2908.

Statement to the effect that the draught was in all cases downwards when the witness examined the openings in the Garrick-street subway in 1864; question considered as to the mode of egress of the incoming air, *Bateman* 3517–3542. 3575–3578. 3601–3643——Absence of any sensible ventilation in the subway when inspected by the present committee, *Hawksley* 3704——Conclusion as to the insufficiency of the ventilation, *Brothers* 4531–4542.

5. *Inspection:*

Inspection of the subway from time to time, *Marrable* 1728.

6. *Use of the Subway for Gas and Water Pipes; character of the Experience derived therefrom:*

The Phœnix Gas Company and the New River Company have had pipes in the Garrick-street subway since 1861, *Bazalgette* 405–410——Explanation as to the pipes in the subway being laid in, and covered by, gravel, at the wish of the companies: witness would recommend their being laid above the gravel, *ib.* 411–421——Statement as to the amount of experience derivable from the subway; neither the gas or water mains leads to any other locality, *ib.* 500–509——Very little mud washed in from the roadway through the opening in the crown of the arch, *Bazalgette* 654; *Marrable* 1711.

Sufficiency of the test of the subway as to its safety and capability, *Bazalgette* 716–720——The pipes were laid by the companies, there being no arrangement as to responsibility for accidents, *ib.* 731–734——Untainted state of the earth in which the gas pipes are laid, there being no leakage, *Bramwell* 1046–1048. 1151. 1169–1174——Means of working the hydrant in the Garrick-street subway without entering the subway for the purpose, *Boulnois* 1259–1265. 1285, 1286——Uncontaminated state of the earth in Garrick-street subway, as compared with the soil in the streets, *Pole* 1371–1373.

Discovery

GARRICK-STREET SUBWAY—continued.

6. *Use of the Subway for Gas and Water Pipes, &c.*—continued.

Discovery by witness in 1864 of a small leakage of gas in the Covent Garden subway; this was caused by extreme carelessness, and witness is not aware of any repairs having since been necessary to the gas pipes, *Marrable* 1719–1723——Slight leakage of water recently from a small service pipe in the subway; very unimportant character of this leakage, which was owing to careless workmanship, *ib.* 1723–1727. 1730–1732.

Data for the statement as to the greater cost of laying a water pipe in the Garrick-street subway than in the street, *Muir* 2373–2380. 2492–2507——Explanation of the circumstances which led to the use of the Covent Garden subway by the New River Company, *ib.* 2572–2574——No repairs of any moment have yet been required, nor has any inconvenience yet arisen from the use of the subway, *ib.* 2575–2578.

Very slight evidence afforded by the subways in Garrick-street and Southwark-street as to the difficulties to be encountered, *Greaves* 2995.

Request of the Metropolitan Board at which the Equitable Gas Company laid two 5-inch pipes in the subway, *Brothers* 4518–4521——Stipulation made by the company that the pipes should be buried in earth, so that any leakage might be absorbed, *ib.* 4522–4530——Inconvenience caused by shutting off the gas in Garrick-street when anything is being done to the pipes in the subway, *ib.* 4588–4590——Data for concluding that the cost of laying pipes was greater in the subway than in the streets, *ib.* 4646–4655——No demand for rent was made, the Metropolitan Board having been anxious that the pipes should be laid there as an experiment, *ib.* 4670–4673.

GAS PIPES:

1. *Generally in Approval of Subways for Gas Pipes.*
2. *Generally in Disapproval of Subways.*

1. *Generally in Approval of Subways for Gas Pipes;*

Witness has paid considerable attention to the question of subways, and cites several reasons for concluding that they are very advantageous for the laying of gas and water pipes, *Tarbotton* 66 *et seq.*——Confirmation since 1864 of the view entertained by witness that gas pipes may be laid in subways with great public advantage, and with greater security against leakage than when laid in the streets, *Bazalgette* 430, 431——Witness has become still more convinced since 1864 as to the advantage and the safety of laying gas and water pipes in subways, *Hemans* 843, 844. 881.

Witness has inspected the subways in Paris, London, and Nottingham, and has been confirmed in the opinion that subways are a great advantage, not only to the public but the gas and water companies, *Bramwell* 990–1001——Witness considers that both for gas pipes and water pipes the use of subways would be very desirable, not only for the public but for the companies, *Boulnois* 1208——Confirmation since 1864 of the views then expressed by witness in favour of subways for gas and water pipes, *R. Jones* 1542–1545—— Witness has always been convinced of the advantage of subways for gas and water pipes; nature of the experience on which such conviction is founded, *Marrable* 1700–1707. 1716–1718——Great facility generally in the laying of gas mains in subways, *H. E. Jones* 1747.

2. *Generally in Disapproval of Subways:*

Careful consideration by witness since 1864 of the question of subways for gas and water pipes, nothing having occurred to remove his objection to them, *Greaves* 2922, 2923. 3008, 3009. 3036–3040——Confirmation since 1864 of the objection always entertained by witness against the use of subways for gas pipes, *Belgrand* 3303, 3304——Confirmation since 1864 of the views then expressed by witness in opposition to subways for the reception of gas pipes, *Hersey* 3203–3205.

Repetition of the opinion that subways in London for gas and water pipes are infeasible and impolitic, or in other words, "practically impracticable," *Hawksley* 3834–3836——Confirmation since 1864 of the views then expressed by witness in opposition to the use of subways, *Brothers* 4607, 4608——Conclusion as to subways not being fit places for gas pipes, *Letheby* 5101.

See also *Arbitration. Arrangement of Pipes. Bent Pipes. Chartered Gas Company. Commercial Gas Company. Cost. Disturbance of Pipes. Durability of Pipes. Engineers. Experiments. Explosions. Garrick Street Subway. Jointing of Pipes. Leakage of Gas. Nottingham. Openings in the Streets. Paris. Rent. Responsibility. Service Pipes. Southwark-street Subway. Ventilation. Vibration.*

Glasgow. Instance at Glasgow of an explosion in a vault into which some gas had leaked, *Bateman* 3405. 3427–3429.

Goswell-street Station (*Chartered Gas Company*). Erection by witness of a subway at the Goswell-street station in 1854, in which there are several mains and service-pipes without any escape of gas having arisen, *Upward* 2101–2103——Size of the subway at Goswell-street station, and total length of pipes laid in it; inference as to the safety of subways generally, *ib.* 2132–2142.

Gray's Inn Road. Great expense incurred in repaving Gray's Inn-road in 1861, whereas in 1864 the New River Company broke it up in order to lay down some mains which might just as well have been laid before the new paving, *Isaacs* 9–11. 35–39. 52–55. 60–62.

Explanation as regards the opening by the New River Company of the pavement of the Gray's Inn-road in 1864, in order to lay a 16-inch main, that the necessity for such main could not have been foreseen in 1861, before the road was newly paved, *Muir* 2346–2350.

Greaves, Charles. (Analysis of his Evidence.)—Is engineer to the East London Waterworks Company, 2911——Large extent of the district supplied by the Company, the total length of the pipes being about 475 miles, and there being about 300 miles of streets supplied, 2912–2921——Careful consideration by witness since 1864 of the question of subways for gas and water-pipes, nothing having occurred to remove his objection to them, 2922, 2923. 3008, 3009. 3036–3040——Power of the Metropolitan Board to make a subway in the new Whitechapel-road, about to be made, 2923–2925——Particulars relative to the Burdett-road, recently completed in the district of witness's company, as bearing upon the question of the formation and compulsory use of subways for water-pipes; arrangement as to the pipes laid in this road by the company, 2926–2940. 2947–2949. 3102–3106.

Practice of witness to attach all communication-pipes to the mains by means of a screw, so that it very rarely happens that any disturbance of the streets is afterwards necessary for repairs or leakage, 2941, 2942——Impression as to no re-openings having been necessary in Burdett-road in connection with the communication-pipes originally laid, 2943–2945——Very slight opening required to be made in attaching the communication-pipes in this road, 2946, 2947——Probable use to be made of the proposed new road in Whitechapel for the laying of gas and water-pipes; inconvenience if it were compulsory to lay the pipes in a subway, 2950–2957. 3107–3110.

Advantage of subways to the public in so far as they obviate the breaking up of the streets, 2958, 2959——Cost of subways to the public who would have to pay for them through the rates, 2960——Conclusion that gas pipes will always be liable to leakage, either from defective joints, or from accidents or carelessness, 2961–2965——Tendency of gas leakage in a subway to collect until an explosive mixture is formed, 2966–2970——Difficulty in estimating the amount of injury to water pipes in a subway from an explosion of gas, 2970.

Equal liability to the fracture or bursting of water-pipes in a subway as in the street, 2971–2975——Respects in which the bursting of a water-main would be more injurious if it happened in a subway, 2976–2981. 3086–3091——Necessity of artificial light in laying and repairing the pipes, 2982–2986——Special precautions necessary in order to prevent danger from the use of lights during repairs, &c., 2987, 2988——Impression that the expense of repairs would, on the whole, be greater in a subway than in the open ground, 2989–2991.

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Innes, William. (Analysis of his Evidence.)—Is engineer to the Phœnix Gas Company, 4262, 4263——The company have two large mains in Southwark-street; great expense incurred in laying them through the refusal of the Metropolitan Board to allow them to be laid when the street was being formed, and before it was paved, 4264–4280——Insufficiency of the space in the Southwark-street subway if it be used for pipes conveying supplies to districts beyond, 4281–4287——Explanation of the mode in which the gas mains are laid in Southwark-street, and in which the services are laid on to the houses, 4288–4297——Increased cost of the service pipes if the mains be laid in subways; such cost falling, indirectly, on the consumer, 4299–4307.

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Evidence, 1867—*continued.*

Inspection by Committee. Witness understands that before the Committee arrived at the Garrick-street subway in order to inspect it, the subway had a longer and fuller ventilation than usual, by the flap of the side entrance having been opened at an early hour, *Muir* 2443.

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Absence of difficulty in connecting pipes in subways with pipes in the streets at different levels, *Bazalgette* 467–479——Further approval of Mr. Upward's plan for making new joints without any gas escaping, *ib.* 667, 668.

Advantage of the facility of jointing without opening the ground for the purpose, *Bramwell* 1013. 1016–1020——Hurried and defective manner in which joints are made under the present system, *ib.* 1016–1020——Very inefficient jointing in London on account chiefly of the inutility of more perfect work through the constant disturbance of the pipes, *Boulnois* 1224–1226. 1275–1277.

Probability of the joints being better made in subways than in streets, so that subsequent leakage from the joints is very improbable, *Pole* 1344–1348. 1357——Contemplated melting of the lead above ground when making the joints in any subways, *ib.* 1406–1408——Way in which the joints may be filled up in the subway without introducing a fire for filling up with lead, *H. E. Jones* 1859, 1860——Way in which molten lead could be provided for making the joints, without having a fire in the subways, *Easton* 2025–2033.

Explanation of the apparatus invented by witness for connecting service pipes with gas or water mains without any escape of gas or water during the operation, *Upward* 2105–2127. 2143–2147.

Considerable difficulty in making side connections from mains in subways, *Muir,* 2386–2426; *Hersey* 5234——Importance of the joints being very carefully attended to, whereas in subways the performance could not be efficiently overlooked, *Bateman* 3454–3458——Examination to the effect that the jointing of water pipes in the streets is not done so hurriedly as to prevent proper inspection of the work; defective joints would moreover be readily exposed by leakage, *ib.* 3483–3496.

See also *Labour and Workmanship.* *Leakage of Gas.* *Light.* *Paris,* 7. *Service Pipes.*

Jones, Henry Edward. (Analysis of his Evidence).—Engineer to the Wandsworth and Putney Gas Company; laid the gas-pipes in the Southwark-street subway, 1733–1738——Three different sized pipes laid in the subway in 1864; very successful manner in which the operation was carried out, 1738–1741——Superintendence also by witness in March last of the laying of 144 yards each of 18-inch pipe and 9-inch pipe: not the slightest difficulty was experienced, 1742–1746——Great facility generally in the laying of gas mains in subways, 1747.

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Liability of pipes laid under the streets to vibration and other disturbing causes, so that the joints become loosened, 1757–1759——Frequent difficulty in laying pipes level on account of the obstruction caused by other pipes, 1758, 1759. 1801–1803. 1806————Great saving of cost by laying pipes in subways, chiefly through the economy of labour, 1760–1763. 1790——Particulars relative to experiments by witness in testing the 18-inch and 12-inch gas pipes in Southwark-street subway; causes to which some diminution in the volume of gas in the pipes was owing, there having been no leakage whatever, though a very high pressure was applied, 1764–1776.

Disadvantage under which these pipes were laid as regards the jointing; their tightness notwithstanding, 1776-1780——Sufficiency of the ventilation for all practical purposes, 1781——Non-complaint by the workmen in regard to the light, 1782——Absence of danger from the men smoking in the subway, 1783–1784——Greater cost estimated by witness than by his father for chairs or supports for the pipes: concurrence otherwise in their estimates of the saving to be effected, 1785–1799.

Instance of the laying of some water-pipes in close proximity to gas-pipes, the latter having first been displaced by the Water Company: inference as to there having been no dread of contamination from the gas, 1801-1806. 1809–1814. 1852–1854——Concurrence of some engineers in the view that there is no serious mechanical difficulty in arranging the pipes in subways, 1807, 1808——Suggestion that flat or oval pipes may be used for gas in crossing from one side to the other, 1808.

Opinion as to the sufficiency of the experiment applied by witness to 144 yards of pipe, in order to prove the greater tightness of pipes laid in subways than in streets, 1815–1827. 1849-1851——Facility of placing several very large mains in any subway designed with a view to such requirements, 1828–1834. 1855–1858——Very exceptional instances of 36-inch mains in London, 1833——Belief that by proper care gas leakages which lead to explosions may be entirely stopped in subways, 1834–1840——Question considered

Jones, Henry Edward (Analysis of his Evidence)—*continued.*

considered as to M. Belgrand having stated, in 1864, that the pipes in the subways or sewers in Paris were much affected by vibration: this is not a parallel case to that of the London sewers, 1841–1848.

Way in which the joints may be filled up in the subway without introducing a fire for filling up with lead, 1859, 1860——Accommodation of two houses by one side passage, 1861, 1862——Arrangement proposed for carrying the service-pipes through the cellars of the houses, and for the supply of the street lamps, 1863–1872——Means of repairing any injury to the service-pipes without any difficulty being experienced, 1873–1879.

Improbability of such an accumulation of pipes in the Southwark-street subway as to render impracticable the substitution of a 30-inch pipe for an 18-inch pipe, if found necessary in course of time, 1880–1886——Expediency of any company moving the pipes of another company in order to repair or alter their own pipes, bearing the entire expense, 1887–1889——Greater facility in reaching and repairing the sewer in Southwark-street than if the subway had not been introduced, 1890–1892——Any injury to the pipes through interfering with the sewer should not fall upon the gas or water companies, 1893, 1894——Impediments to any person entering the Southwark-street subway for unlawful purposes, 1895–1905.

Contemplated arbitration in the event of dispute between the companies and the Metropolitan Board as to the size of the pipes to be introduced, 1906, 1907——Facility of still laying pipes in the ordinary way if subways were formed and were filled with pipes, 1909——Anticipated sufficiency of the accommodation provided in Southwark-street subway, though a much larger space would be required in the Strand or Fleet-street, 1910–1917——Probable objection to the use of oval pipes for water, though suitable for gas, 1918, 1919.

Absence of difficulty in carrying the large pipes down the side entrances into the Southwark-street subway, 1920–1923——Greater facility by the use of subways in getting the water out of pipes where there is a dip, 1924–1927——Liability to explosion by an admixture of gas with air in the proportion of about one-tenth of the former, 1928–1935——Tendency of carburetted hydrogen to ascend through the atmospheric air, though it mixes with the atmosphere more or less, 1936–1939.

Jones, Robert. (Analysis of his Evidence.)—Is Engineer to the Commercial Gas Company; has had a lengthened experience in connection with gasworks, 1539–1541——Confirmation since 1864 of the views then expressed by witness in favour of subways for gas and water pipes, 1542–1545——Particulars relative to the experimental laying of six sets of gas pipes by witness in the Southwark-street subway in 1864, in order to prove that there was ample space for the pipes, and that no danger was involved, 1546 *et seq.*

Great pressure applied in order to test the soundness of the pipes laid in the subway in 1864; entire absence of any escape of gas, 1561–1577——Advantage of reflectors as greatly increasing the light for working in subways, 1580–1582——Total of 5 *s.* 3½ *d.* as the whole cost per yard of laying the 18-inch gas main in the Southwark-street subway, including wooden piers, 1584–1595. 1664, 1665——Much greater cost of laying an 18-inch main in a street than in a subway, 1588–1590——Contemplated use of brick piers in subways; this would add about 6 *d.* a yard to the expense, 1594–1598.

Explanation with reference to the intended use by the Commercial Gas Company of the subway at Millwall Dock, 1599–1606——Experience of some thirteen years with some gas pipes at witness's works, some of them in a short subway, during which period no leakage has ever occurred, the pipes never having been disturbed, 1607–1613. 1670, 1671——Expediency of not entering a subway with a naked candle when a leakage had been going on, 1614–1618——Danger of explosion when the mixture of gas and of air is as one to nine or ten, 1619.

Circumstance of the Commercial Company not having petitioned against the present Bill nor the Bill of 1864; question hereon as to the willingness of the Company to take the risk of explosions, 1620–1625. 1673–1675——Examination with further reference to the amount of facility in the Southwark-street subway for laying all the pipes that may be required; denial that serious difficulty would arise, more especially as regards connections with pipes or mains in streets at right angles, 1626 *et seq.* 1666–1669. 1672.

Further statement of the circumstances under which the pipes were laid by witness in the Southwark-street subway, it not being in the district of the Commercial Company, 1676–1697——Statement that the gas for the lamps in Southwark-street is supplied by the Phœnix Company through the subway; witness is not aware whether any rent is paid by that Company, 1676–1697.

K.

Knight's Soapworks. Illustration, in the case of Knight's soapworks in Lambeth, of the difficulty to be encountered in subways, so as to carry off gas leakages from sewers, *Simpson* 4022–4027. 4198–4205.

L.

Labour and Workmanship. Readiness of workmen to carry on jointing operations in subways, *Hemans* 960, 961—— More careful and leisurely workmanship in subways than in trenches, *Pole* 1346–1348——Reasons for concluding that workmen would be more careful when working in subways than in the streets, *ib.* 1391–1397. 1425—— Willingness of the workmen to enter the subways without fear of any danger in laying the pipes or making joints, *Easton* 1916. 2033.

Witness has worked for Messrs. Easton, Amos, & Co., in the Southwark-street subway without experiencing any inconvenience or danger, and would readily work at the laying and jointing of pipes in subways generally, *Pitchenau* 2078–2096.

Conclusion as to the workmen requiring more looking after in subways than in open trenches, *Greaves* 2990. 3046–3054——Increased difficulty of working in subways or in laying new pipes accordingly as the space is already occupied by pipes, *ib.* 2992–2994 ——Further statement as to the difficulty of working in subways when there are numerous pipes there; less difficulty in getting at the pipes in the ground, *ib.* 3055–3068. 3116–3119——Peculiar facilities in laying pipes in an open trench in the streets, *Bateman* 3447–3453.

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Less expeditious workmanship in subways than in open trenches, *Innes* 4341——More careful character of the work when done in open trenches, on account of the better supervision than in subways, *Brothers* 4552, 4553. 4656–4658—— Liability to fractures of pipes in subways by carelessness on the part of workmen, *ib.* 4569–4572 ——Less expensive and more efficient superintendence in open trenches than in subways, *Hersey* 5227–5231. 5301.

Lateral Galleries. Accommodation of two houses by each side passage in subways, *H. E. Jones* 1861, 1862—— Belief as to there being no fear of an accumulation of gas in the side passages; facility, however, of meeting any objection on this score, *Bazalgette* 2886–2894.

Effect of lateral shafts or side galleries in increasing the risk of explosion from gaseous accumulations, *Bateman* 3599, 3600; *Hawksley* 3740–3744——Great danger of accumulation of gas and of explosions in the side galleries, unless the ventilation be placed in a proper condition, *Woodhouse* 3939–3941. 3969–3977—— Suggestions as to the mode of ventilating the side passages, in the event of artificial ventilation being adopted, *ib.* 3951–3954——Peculiar liability to accumulations of gas in the side passages to the house, *Simpson* 4067.

See also *Southwark-street Subway,* 3. *Ventilation.*

Laying of Pipes. See *Arbitration. Arrangement of Pipes. Chairs or Supports. Cost,* 3. *Disturbance of Pipes. Durability of Pipes. Garrick-street Subway,* 6. *Gas Pipes. Jointing of Pipes. Labour or Workmanship. Nottingham. Openings in the Streets. Paris. Removal of Pipes. Rent. Service Pipes. Size of Subways. Southwark-street Subway,* 7. *Tramways. Vibration. Water Pipes.*

LEAKAGE OF GAS:

1. *Evidence in favour of Subways on the Score of Leakage of Gas.*
2. *Evidence to a contrary purport.*
3. *Amount of Leakage under the present System.*
4. *Question of Leakage in the Garrick-street Subway.*
5. *Question of Leakage in the Southwark-street Subway; Experiments on the Subject.*

1. *Evidence in favour of Subways on the Score of Leakage of Gas:*

Advantage of subways as greatly diminishing the liability to leakage from the pipes, *Tarbotton* 69–73. 76–78——Great improbability of any escape of gas in subways if the pipes

LEAKAGE OF GAS—continued.

1. *Evidence in favour of Subways on the Score of Leakage of Gas*—continued.

pipes are carefully laid, *Tarbotton* 79——Slight extent to which there is any leakage of gas through the pipes, except at the joints, *Bazalgette* 663–666.

Injurious contamination of the adjacent soil by laying gaspipes in streets, whilst there is no taint of gas in the soil when the pipes are laid in subways, *Bramwell* 1003-1009——Decrease of leakage in subways, owing to the better laying of the pipes in the first instance, and the facility of inspection, *ib.* 1015——Very remote chance of gas leakages from the joints of pipes in subways; instance of this in the Garrick-street Subway, *ib.* 1046–1048. 1051——Practicability of laying gas-pipes in subways so securely that no leakage will take place at the joints, *ib.* 1138–1150——Belief that gas does not escape through the pipe itself, *ib.* 1147. 1163, 1164——Liability at present to large escapes of gas without detection, *ib.* 1162.

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2. *Evidence to a contrary purport:*

Belief as to the impracticability of avoiding leakage in subways, either through accident, negligence, or mischief, *Muir* 2427–2439——Probability, however, of subways affording some additional security against leakage, *ib.* 2552*——Conclusion that gaspipes will always be liable to leakage, either from defective joints or from accidents or carelessness, *Greaves* 2961–2965——Probability of gas leakage finding its way from the streets into the subways, *ib.* 3123, 3124.

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Leakage or escape of gas not only at the joints of the pipes, but sometimes through the pipes themselves from defective manufacture, *Simpson* 4028–4035——Instance at Windsor Castle of an escape of gas not only from the joints but from the pipes, *ib.* 4035–4038——Danger of gas escapes into a subway if gas pipes, though excluded, are obliged to be laid near the surface or roof of the subway, *ib.* 4079, 4080——Advantage if gas leakages could be promptly detected and remedied; doubt as to subways affording this advantage, *ib.* 4142–4145——Further statement as to the liability of gas leakage from the porosity of the pipes and from fractures from blows and concussions, *ib.* 4146–4158. 4213–4215.

Belief that in subways leakage at the joints cannot be absolutely prevented, *Innes* 4327——Facility of dealing with large escapes in open trenches as compared with subways, *Brothers* 4573–4575——Dissent from Mr. Carpmael's view as to gas leakages being detected through a discolouring of the pipes if white-leaded, *ib.* 4576, 4577——Difficulty in detecting the place of escape in a subway except by applying a light, *ib.* 4578–4581.

3. *Amount of Leakage under the present System:*

Great contamination of the soil by leakage from gas pipes; injury to the public health thereby, *Hemans* 962; *Bramwell* 1003–1009; *Boulnois* 1230. 1298–1303——Admission as to escapes of gas from pipes in the streets going on for a considerable time without being detected, *Bateman* 3497–3502——Very long period for which gas pipes have lain in the streets without any leakage arising, *Innes* 4325, 4326.

Very long period for which some mains of the Imperial Company have been laid, which on examination were found perfectly tight and sound, the number of leaky joints being very few, *Hersey* 5216–5220. 5302–5311——Average of about fifteen per cent. as the loss through unaccounted for gas, the loss from leakage not being more than from three to five per cent., *ib.* 5260, 5261. 5321–5325.

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4. *Question of Leakage in the Garrick-street Subway:*

Absence of gas leakage in the Garrick-street Subway, the earth being quite uncontaminated, *Bramwell* 1046–1048. 1151. 1169–1174——Uncontaminated state of the earth in the subway as compared with the soil in the streets, *Pole* 1371–1373——Discovery by witness, in 1864, of a small leakage of gas in the Covent Garden subway; this was by extreme carelessness, and witness is not aware of any repairs having since been necessary to the gas pipes, *Marrable* 1719–1723.

5. *Question of Leakage in the Southwark-street Subway; Experiments on the Subject:*

Satisfactory experiments recently made with the gas pipes in the subway, *Bazalgette* 428, 429——Great pressure applied in order to test the soundness of the pipes laid in the subway in 1864; entire absence of any escape of gas, *R. Jones* 1561–1577——Particulars relative to experiments by witness in testing the 18-inch and 12-inch gas pipes in the subway; causes to which some diminution in the volume of gas in the pipes was owing, there having been no leakage whatever though a very high pressure was applied, *H. E. Jones* 1764–1776.

Careful experiments recently made by witness upon the subject of gas leakage in the subway; very slight escape or leakage, even though a very high pressure was put on, *Frankland* 2151–2159. 2181–2189——Conclusion that the escape proceeded entirely from the joints, and that there is not any leakage of gas through the pipes themselves, *ib.* 2160–2165. 2183–2187. 2205.

Statement relative to an escape of gas in the subway when witness was there in 1864, *Greaves* 3013–3016. 3023–3029——Non-detection by witness of any leakage from the pipes in the subway, *Innes* 4505–4507.

See also *Disturbance of Pipes. Equitable Gas Company. Explosions. Garrick-street Subway,* 6. *Health. Inspection. Jointing of Pipes. Knight's Soap Works. Labour and Workmanship. Nottingham. Paris. Service Pipes. Southwark-street Subway,* 8. *Supervision. Ventilation. Vibration.*

Leicester-square Explosion. Reference to an explosion of gas in Leicester-square as having happened in a house, so that the question of subways does not apply in this case, *Evans* 1481–1483. 1534–1538.

Length of Subways. Facility of making and using a subway with equal safety, if five miles in length instead of only a few hundred yards, *Tarbotton* 318.

Letheby, Dr. Henry. (Analysis of his Evidence.)—Is gas analyst for the City of London, 5085, 5086——Attended some recent experiments in the Southwark-street subway, but was not allowed to make any suggestions as to the conduct of the experiments, 5088–5091. 5105–5112——Submits that these experiments are by no means conclusive as to the safety of the subway, chiefly because of the very reduced pressure at which the gas escaped, so that the amount of escape was probably very limited, 5092 *et seq.*

Artificial ventilation created in the subway by reason of the great heat from igniting some jets of gas in the first experiment, 5097*, 5098. 5103, 5104. 5118. 5121——Tendency of gas escaping in a subway to diffuse itself, but not very quickly, 5098–5100——Conclusion as to subways not being fit places for gas-pipes, 5101.

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Light (*Subways*). Sufficient light in the subways for working at the pipes, *Bazalgette* 463, 464——Improved light to be obtained by means of reflectors, *ib.* 755——Doubt as to the advantage of keeping an artificial light always burning, *ib.* 756, 757——Very good light in the Southwark-street subway, whilst by the use of reflectors much additional light may be provided, *Hemans* 873–877.

Considerable light in the Southwark-street subway; whilst, if necessary, artificial light may be readily provided, *Pole* 1349–1352——Frequent laying of pipes in streets by gas-light, *ib.* 1353, 1354——Amount of daylight in the subway further adverted to; safety-lamps might, if necessary, be used, *ib.* 1398–1405——Advantage of reflectors as greatly increasing the light for working in subways, *R. Jones* 1580–1582——Non-complaint by the workmen in regard to the light in the Southwark-street subway, *H. E. Jones,* 1782.

Facility of carrying on the work in subways without candles, ample light being obtained by the use of reflectors, *Easton* 1962–1964. 2032–2034——Further statement as to the means of lighting the subways, so as to dispense with candles, and to meet the objections needlessly made on this score by the opponents of the Bill, *ib.* 2020–2024. 2034.

Cost involved in the use of artificial light, *Muir* 2379. 2579–2581——Opinion as to the inadequacy of reflectors for lighting the subways when repairs are required, *ib.* 2381–2383

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2383——Necessity of artificial light in laying and repairing the pipes, *Greaves* 2982–2986——Special precautions necessary, in order to prevent danger from the use of lights during repairs, &c., *ib.* 2987, 2988——Uselessness of reflectors as a means of facilitating the detection of gas escapes, *Hawksley* 3689. 3696, 3697.

Belief as to the impracticability of doing all the work required in subways without the use of lights, *Simpson* 4054, 4055——Unfitness of reflected light for working by in subways, though beneficial for inspection, *Innes* 4312–4314——Numerous candles used when the pipes were laid in the Southwark-street subway by the Metropolitan Board, *ib.* 4324——Insufficiency of reflectors for working by in subways, *Brothers* 4551; *Hersey* 5235, 5236.

Ample light in the Southwark-street subway, by means of reflectors, for the conduct of the experiments, and for making a record of the result, *Ansell* 5035–5040.

Liquorpond-street. Comment in the report of the Holborn District Board for 1866 upon the breaking up of Liquorpond-street shortly after it had been newly paved, *Isaacs* 21.

Statement that the New River Company did not re-open Liquorpond-street after it was newly paved, *Muir* 2351, 2352.

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Madrid. Particulars relative to the subways used in Madrid for the water mains; circumstance of the gas-pipes not being also laid in them, *Bateman* 3459–3464. 3467–3479——Size and arrangement of the subways at Madrid adverted to, with reference more especially to there being no lateral passages or galleries for the service pipes to the houses, *ib.* 3588–3598.

Mains and Pipes. See *Arrangement of Pipes.* *Cost.* *Durability of Pipes.* *Garrick-street Subway,* 6. *Gas Pipes.* *Jointing of Pipes.* *Leakage of Gas.* *Nottingham.* *Service Pipes.* *Southwark-street Subway.* *Water Pipes.*

Maintenance of Pipes. Opinion that as regards maintenance of pipes no saving would be effected by laying them in subways, *Hersey* 5259.

Maintenance of Subways. Contemplated maintenance of the subways by the parties in whose interest they are constructed, *Greaves* 312——Opinion that the companies should pay for the maintenance of the subways and the supervision of the works and pipes, *Bazalgette* 703, 704.

Clause proposed on the part of the Metropolitan Board, and objected to on the part of the Gas and Water Companies, in regard to the maintenance of the subways in an efficient state of ventilation and repair, *Ev. p.* 320.

Mansion House Street. With regard to the Metropolitan Improvement Act of 1863, the road authorised has not yet been constructed, and the question of a subway has not been determined, *Bazalgette* 2768–2772. 2784. 2789.

Marrable, Frederick. (Analysis of his Evidence.)—Was formerly superintending architect to the Metropolitan Board of Works; assisted in preparing the original designs for the subways, 1698, 1699——Has always been convinced of the advantage of subways for gas and water pipes; nature of the experience on which such conviction is founded, 1700–1707. 1716–1718——Vertical openings into the roadway by which the Covent Garden subway is ventilated; their sufficiency, 1709–1715——Mud does not come down in any appreciable quantity, 1711.

Discovery by witness, in 1864, of a small leakage of gas in the Covent Garden subway: this was caused by extreme carelessness, and witness is not aware of any repairs having since been necessary to the gas pipes, 1719–1723——Slight leakage of water recently from a small service pipe in the subway; very unimportant character of this leakage, which was owing to careless workmanship, 1723–1727. 1730–1732——Inspection of this subway from time to time, 1728——Doubt as to a daily inspection of subways being necessary, 1729.

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Metropolitan Railway. Explanation as to the tunnel of the Metropolitan Railway between Great Portland-road and Gower-street not being kept free from a certain kind of gas by means of the ventilation provided, *Pole* 1431–1437.

Millwall Dock Subway. Explanation with reference to the intended use by the Commercial Gas Company of the subway at Millwall Dock, *R. Jones* 1599–1606.

Muir, James. (Analysis of his Evidence.)—Is engineer to the New River Company, 2344——Explanation as regards the opening by the company of the pavement of the Gray's Inn-road, in 1864, in order to lay a 16-inch main, that the necessity for such main could not have

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have been foreseen in 1861, before the road was newly paved, 2346–2350——Statement that the company did not re-open Liquorpond-street after it was newly paved, 2351, 2352——Inaccuracy of a statement as to a certain explosion in Holborn having been caused by one of the company's workmen, 2353, 2354.

Statement showing that, omitting the year 1864, which was an exceptional one, the average payments by the New River Company, in respect of paving in the Holborn district since 1863 have been less than 200 *l.* a-year, 2355–2363. 2542–2545——Very small average size of all the openings made by the New River Company for the repair or alteration of their pipes, 2364–2367——Very little interference with the traffic by reason of the openings, 2368–2371——Numerous openings still to be made in the streets, even if the water pipes were in subways, 2372.

Cost of 65 *l.* in laying the New River Company's pipe in the Garrick-street subway, whilst it was calculated that for 56 *l.* it could have been laid in the street, 2373–2380——Several sources of expense in laying and maintaining pipes in subways, which do not now arise, 2377–2380. 2384, 2385. 2579–2581——Opinion as to the inadequacy of reflectors for lighting the subways when repairs are required, 2381–2383——Cost involved in constant inspection, 2384, 2385. 2435, 2436.

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Variable ventilation in the Garrick-street subway, 2441–2444——Considerable current necessary in order to carry off a large leakage, 2445——Fear of injury to water pipes in subways from gas explosions, even if the gas pipes are laid in the streets, 2446–2455——Want of ventilation of the side passages in the Garrick-street subway, 2456, 2457——Expense necessary for duplicate pipes if the existing pipes were to be removed into subways, 2458, 2459.

Reference to a certain diagram, as showing the great difficulty of placing the pipes now in Cheapside in such a subway as that in Garrick-street; cross-examination hereon, 2460–2491. 2535–2539——Consideration of the effect of the districting arrangement in reference to the number of gas-pipes to be required in a subway in Cheapside or any other leading thoroughfare, 2475–2491——Investigation of the data for the statement as to the greater cost of laying a water pipe in the Garrick-street subway than in the street, 2492–2507.

Exceptional instances of its being necessary to break up newly paved streets in order to lay down larger mains, 2508–2519——Dissent from the evidence of Mr. Easton as to the prices at which pipes may be laid in subways, 2520–2534——Willingness of the companies to use subways generally, but for the difficulties and the risk, 2540, 2541. 2546.

Apprehension lest terrific explosions might sometimes be caused, but for which witness would approve of subways for gas and water pipes, the question of cost being a secondary consideration, 2546–2552——Doubt as to the adequacy of a large provision of ventilation for always preventing explosive mixtures being formed, 2551, 2552——Probability of subways affording additional security against leakage, 2552*.

Illustration, in the case of an injury to the pipes of the New River Company through an accident at the Fleet Sewer, of the great difficulty of fixing the liability with reference to accidents in subways, 2553–2571. 2582–2593——Explanation of the circumstances which led to the use of the Covent Garden Subway by the New River Company, 2572–2574——No repairs of any moment have yet been required, nor has any inconvenience yet arisen from the use of the subway, 2575–2578.

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New River Company. See *Garrick Street Subway*, 6. *Water Pipes.*

NOTTINGHAM:

1. *Representations favourable to the Use of the Subways at Nottingham for Gas and Water Pipes, and in condemnation of the Action of the Gas and Water Companies in the matter.*
2. *Explanatory Statement by Mr. Hawksley in defence of the Course pursued by the Gas and Water Companies; Correspondence on the Subject.*

1. *Representations favourable to the Use of the Subways at Nottingham for Gas and Water Pipes, and in condemnation of the Action of the Gas and Water Companies in the Matter:*

Sundry particulars in connection with the subway constructed under witness's direction in Victoria and Queen-street, Nottingham, in 1863; similarity of this subway to the one near Covent Garden, *Tarbotton* 83–105——The length of the subway in the two streets is

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1. *Representations favourable to the Use of the Subways, &c.*—continued.

is about 550 feet, the width being ten feet in Victoria-street and eight feet in Queen-street, whilst the height is about seven feet, *Tarbotton* 97–105——Application made by the corporation of Nottingham to the gas and water companies to lay their pipes in the subway, such application having been complied with, and no leakage or inconvenience having since been experienced, *ib.* 106–112. 126–129.

Efficient ventilation of the subways by means of iron gratings in the crown of the arch, *Tarbotton* 113. 119–121——Very uniform character of the temperature, *ib.* 117, 118——Information as to the mode in which the pipes are laid in the subway, *ib.* 122. 125. 211–219——Arrangement in regard to any escape of water being carried into the sewers, *ib.* 122.

Explanation with reference to a further subway formed in Lister Gate in 1865, the length of which is about 4,000 feet; improved plan of construction, as compared with those made in 1863, *Tarbotton* 130–142——Comment upon the refusal of the gas and water companies to lay their pipes in the Lister Gate Subway; evidence of Mr. Hawksley before the Committee of 1864, adverted to hereon, *ib.* 143–151. 165–191——Circumstance of telegraph wires having been laid in this subway, *ib.* 151–153.

Construction of a third subway, in 1866, in Market-street, the town council having been unanimous on the question, notwithstanding the refusal of the companies to use the second subway, *Tarbotton* 154–156. 164. 180. 189——Plan of construction of the Market-street Subway, the length being about 450 feet, and the ventilation and lighting being very efficient, *ib.* 157–162——Completion of the Lister Gate Subway before the companies refused to use it; reference hereon to a letter from the gas company, dated 29th August 1865, in which the grounds of refusal are set forth, *ib.* 165–186——Undertaking subsequently given by the corporation to indemnify the gas company against all responsibility in respect of accident; further refusal of the company to use the subway, *ib.* 187–195.

Strong feeling of the public in Nottingham as well as of the corporation in favour of subways, *Tarbotton* 189–191. 196–198——Circumstance of no application having been made by the companies to remove the pipes from the Victoria-street Subway, *ib.* 199, 200——Examination with further reference to the mode of construction and arrangement of the Victoria-street Subway, *ib.* 201–225——Way in which the service pipes are arranged in connection with the gas and water mains in the subway, *ib.* 226–240. 306, 307.

Particulars showing the uniformity of the temperature in the Victoria-street Subway, *Tarbotton* 241–246——Means of turning the water off from outside the subway, as well as by going into the subway, *ib.* 250–257. 303–305——Views expressed by Mr. Hawksley in 1864, upon the question of subways in Nottingham, further adverted to with reference to the subsequent refusal of the companies to use the subways in Lister Gate, *ib.* 262–273. 299–302——Suggestion made by the engineer of the gas company, previously to August 1865, that the pipes should be laid close to the kerbstone, *ib.* 274–279——The corporation did not demand any charge for the use of the subways, *ib.* 280, 281.

Statement in further explanation of the character of the indemnity offered by the corporation, and refused by the gas company, *Tarbotton* 283–298. 315–326——Confirmation since 1864, of the views then expressed by witness as to the success and safety of the subway in Victoria-street, *ib.* 308, 309——Justification of the indemnity offered by the corporation, *ib.* 315–328——It was contemplated that the corporation should have the management of the pipes, &c., if they gave an indemnity, *ib.* 319. 324. 332——Refusal of the water company at Nottingham, as well as the gas company, to lay their mains in the Lister Gate Subway, *ib.* 344–347——Way in which the mains are laid, further adverted to, *ib.* 348–351.

Experience of Nottingham adverted to, as proving the safety of subways for gas and water pipes, *Bramwell* 1065–1069.

Almost unanimous feeling in the town council of Nottingham, as to the advantages and the safety of subways for gas and water pipes, *Patchett* 2281. 2292——Use by the gas and water companies, without objection of the first subway made in the town, whilst they have refused to lay their pipes in two others made more recently, *ib.* 2282–2286. 2308–2315——Unanimous feeling of the improvement committee of the town committee in favour of subways; offer by the committee to give a guarantee of indemnity to the gas company for two years, if they would use the Lister Gate Subway, *ib.* 2287–2301——Admission as to the improvement committee not having power to give a legal guarantee; belief that many of the members would however have given a personal guarantee, as showing their confidence in the subways, *ib.* 2290. 2299. 2301–2307. 2325–2329.

Question considered as to the reason assigned by Mr. Hawksley for recommending the companies to use the Victoria-street Subway, though he has objected to their using those since constructed, *Patchett* 2316–2331——Non-payment of any rent for the use made of

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1. *Representations favourable to the use of the Subways, &c.*—continued.

the Victoria-street Subway; willingness also of the town council to allow the use of the other subways free of rent, on account of the great public advantage, *Patchett* 2332–2338. 2343——Construction of a third subway, though the companies had previously refused to use the second subway, the town council believing that the use of subways is only a question of time, *ib.* 2339–2342.

2. *Explanatory Statement by Mr. Hawksley in defence of the Course pursued by the Gas and Water Companies; Correspondence on the subject:*

Information relative to the circumstances under which witness advised the gas and water companies at Nottingham to make use of the first subway constructed by the corporation, *Hawksley* 3679–3681. 3687——Very small extent of this subway, and very small pipes placed in it; special precautions, moreover, taken, in order to prevent any explosion when the companies' workmen are in the subway, *ib.* 3680, 3681. 3687. 3803–3806——It was not expected that another subway would be made, and for the sake of peace and quietness witness advised the companies to accede to the request of the corporation, and to place their pipes in the subway, *ib.* 3680.

Refusal of the companies at Nottingham to use two other subways made by the corporation without any previous consultation with them; correspondence handed in containing full explanations hereon, *Hawksley* 3681-3688——Inaccuracy of the statement that the Corporation of Nottingham offered to give an indemnity to the companies, *ib.* 3683.

Further statement of witness's reasons for objecting to the use of the second and third subways at Nottingham, though he had approved of the companies using the first subway made, *Hawksley* 3828-3833. 3912——Further statement that the corporation of Nottingham did not offer, and could not give, a guarantee of indemnity, to the companies in consideration of their using the subways, *ib.* 3919-3922.

Papers and correspondence handed in by Mr. Hawksley, containing explanations in detail, with reference to the question of the gas and water companies laying their pipes in the subways built by the corporation, *App.* 353–362.

Number of Subways. Contemplated formation of subways only in leading thoroughfares' *Isaacs* 28–34. 56–58——Steps taken by the Board in the construction of only three subways; power, however, to make them in several other instances, *Bazalgette* 403, 404——Limited mileage of subways likely to be made in London; advantage if the system could be greatly extended, *Bulnois* 1266. 1298. 1305——Statement that no new subways are being authorised in the present year, *Bazalgette* 2771. 2778.

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Odling, Dr. William. (Analysis of his Evidence.)—Is professor of chemistry at St. Bartholomew's Hospital; has had considerable experience in connection with gas, 5135, 5136——Was present at some recent experiments in the Southwark-street Subway; strong smell of gas in the subway when witness entered it, 5138–5143——Statement to the effect that the escape of gas during the experiments was not sufficient to cause an explosive mixture, on account chiefly of the very reduced pressure, 5144 *et seq.*——Heated state of the subway and consequent artificial ventilation, through some large jets of gas having been previously lighted, 5158, 5159.

Unsatisfactory test afforded unless sufficient gas be allowed to escape for the formation of an explosive mixture, 5171, 5172. 5175-5179. 5187, 5188——Way in which there might be an explosive mixture in some parts of any subway without the whole subway being filled with the mixture, 5180–5182——Dissent from Mr. Ansell's opinion as to the escape from a nine-inch pipe not being sufficient to cause an explosion, 5189, 5190.

OPENINGS IN THE STREETS:

1. *As to the Number and Character of the Openings for Gas and Water Pipes under the present System.*
2. *As to the Effect of the Introduction of Subways.*

1. *As to the Number and Character of the Openings for Gas and Water Pipes under the present System:*

Details relative to the numerous openings made in the Holborn district by the gas and water company, to the great injury of the streets and the great interruption of the traffic, *Isaacs* 5 *et seq.*——Great injury to the pavements through their being broken up for pipes and mains, the payments made by the companies being no adequate compensation for the mischief done, *ib.* 8. 12–15——Great expense incurred by the companies through the numerous openings made in the streets, *ib.* 40–42.

Evidence, 1867—*continued.*

OPENINGS IN THE STREETS—continued.

1. *As to the Number and Character of the Openings for Gas, &c.*—continued.

Very small average size of all the openings made by the New River Company for the repair or alteration of their pipes, *Muir* 2364–2367——Very little interference with the traffic by reason of the openings, *ib.* 2368–2371——Exceptional instances of its being necessary to break up newly-paved streets in order to lay down larger mains, *ib.* 2508–2519.

Practice of witness to attach all communication pipes to the mains by means of a screw, so that it very rarely happens that any disturbance of the streets is afterwards necessary for repairs or leakage, *Greaves* 2941, 2942——Very small size of the majority of the openings now made in the streets, *ib.* 3001, 3002——Unforeseen circumstance to which it is owing that gas and water companies have sometimes to lay down a large extent of new mains, *ib.* 3173–3176——Statement that when pipes are laid in the streets it is rarely necessary to renew the pavement more than twice, whilst in many cases a second paving is not necessary, *ib.* 3200–3203.

More numerous openings made for gas-pipes than for water-pipes, *Simpson* 4076——Care taken by the Imperial Gas Company to lay their pipes so as to cause the least possible inconvenience, *Hersey* 5221, 5222.

2. *As to the Effect of the Introduction of Subways:*

Avoidance of the breaking up of the streets adverted to as the chief public benefit to be derived from subways, *Bazalgette* 780–782——Saving to the companies in not having to break up the streets and repave them, *Bramwell* 1036——Great public advantage of subways as obviating the breaking up of the streets, *ib.* 1021, 1022——Facility of still laying pipes in the ordinary way if subways were formed and were filled with pipes, *H. E. Jones* 1909——Great public advantage in laying pipes in subways as obviating the breaking up of the streets, *Patchett* 2300.

Numerous openings still to be made in the streets even if the water pipes were in subways, *Muir* 2372.

Advantage of laying water mains in subways so far as it would prevent the breaking up of the streets, *Greaves* 2958, 2959; *Bateman* 3400, 3401——Opinion as to the necessity of numerous openings in connection with fire-cocks and plugs, even if the water mains were in subways, *Greaves* 3002–3004. 3071–3074——Several purposes for which the streets must still be broken up if water pipes are to be laid in subways, *ib.* 3122.

Inexpediency of the construction of subways if water pipes only are to be laid in them; necessity in any case of companies still opening the streets for certain purposes, *Simpson* 4068–4078——Very limited extent to which the subways proposed by the present Bill would affect the inconvenience arising from opening the streets; immense mileage of pipes as compared with the length of the subways proposed, *ib.* 4104–4108——Necessity of frequently breaking up the streets, even if there were a large provision of subways, *ib.* 4111–4113——Public inconvenience doubtless experienced from the opening of the streets; reference hereon to the openings for water plugs, and the question of using hydrants as in the Garrick-street Subway, *ib.* 4247–4256.

See also *Cost.* *Gray's-Inn-road.* *Holborn District.* *Southwark-street.*

Oval Pipes. Suggestion that flat or oval pipes may be used for gas in crossing from one side to the other, *H. E. Jones*, 1808——Probable objection to the use of oval pipes for water, though suitable for gas, *ib.* 1918, 1919——Advantage of circular pipes over square or oval pipes, *Easton* 2076, 2077.

Oxford-street Explosion (1863). Ground for concluding that the explosion in Oxford-street in 1863 would not have happened if a subway were used, *Pole* 1333–1340.

P.

PARIS:

1. *Inquiry on the part of the Metropolitan Board into the Subways in Paris, and the Cause of certain reported Explosions.*
2. *Contradictory Evidence on the Subject of the Explosion at the Bridge of Austerlitz in January* 1865.
3. *Report by M. Mary on the foregoing Subject.*
4. *Escape of Gas and consequent Accident at the Bridge of Austerlitz Subway in* 1864.
5. *Subway or Gallery in the Place Napoleon.*
6. *Subway in the Boulevard de Sevastopol.*
7. *System of Jointing the Pipes in Paris.*
8. *Use of the Subways or Sewers for Water Pipes.*
9. *Details generally relative to the Subways or Sewers in Paris as bearing upon the Question of Liability to Gas Explosions.*

PARIS—continued.

1. *Inquiry on the part of the Metropolitan Board into the Subways in Paris, and the Cause of certain reported Explosions:*

Recent inquiry by witness, Mr. Hemans, Mr. Bramwell, and Mr. Boulnois into the subways in Paris; report on the subject dated 1st March 1867, *Bazalgette* 477–480——Object of this inquiry mainly to ascertain more clearly the circumstances connected with certain explosions spoken to by M. Belgrand in his evidence before the Select Committee of 1864, *ib.* 477–483.

Visit of witness and other engineers to Paris in February last in order to inquire for the Metropolitan Board into the use of subways there; notification previously given to M. Belgrand, the engineer of the subways, *Hemans* 794–802——Further statement as to witness having been sent to Paris by the Metropolitan Board, *ib.* 904–907.

2. *Contradictory Evidence on the Subject of the Explosion at the Bridge of Austerlitz in January* 1865:

Conclusions arrived at in regard to the explosion in the subway at the Pont d'Austerlitz as not having been caused by an escape of gas, though so reported by M. Belgrand, *Bazalgette* 477——Examination with further reference to the inspection by witness and other engineers of the Paris subways, and the inaccuracy of certain statements by M. Belgrand in regard to the explosion at the Bridge of Austerlitz, *ib.* 670–684. 725–730——Further reference to the explosion at the Pont d'Austerlitz as having occurred not in the subway but in the gas pipe, *ib.* 768.

Particulars in support of the conclusion that one of the reported explosions of gas in the subway at the Bridge of Austerlitz really occurred in the gas pipe, *Hemans* 817–842——Insufficiency of ventilation and of light in the subway at the Bridge of Austerlitz, *ib.* 820–829——Conclusion, as regards the explosion at the Pont d'Austerlitz, that it occurred in the pipe and not in the subway, *Bramwell* 1055–1060——Witness was one of those requested by the Metropolitan Board to report upon the Paris subways, and confirms the evidence of Mr. Hemans and Mr. Bazalgette on this subject, *Boulnois* 1203–1207. 1231, 1232.

Sundry details in connection with the explosion at the Bridge of Austerlitz on 25th January 1865; conclusion as to the explosion having occurred not only in the gas pipe but in the subway, *Belgrand* 3265, *et seq.*——Great damage done by the explosion in January 1865, *ib.* 3277–3279. 3295——Two men were killed by this explosion, and two others more or less hurt, *ib.* 3280.

Reference to a report by M. Mary upon the explosion of January 1865, in which the cause of the explosion is considered to have been an accident to the valve, *Belgrand* 3282–3284——Several openings for ventilation at the time of the explosion, *ib.* 3286, 3287. 3292——Reconstruction since the explosion, the gas pipe being now enveloped in sand, *ib.* 3290——Report made by witness shortly after the explosion adverted to as having required some correction; this report was furnished to Mr. Bazalgette, *ib.* 3293, 3294. 3321–3328.

Examination with further reference to the cause of the accident in January 1865; dissent from the view that the explosion occurred only in the gas pipe, *Belgrand* 3329–3349. 3376, 3380.

3. *Report by M. Mary on the foregoing Subject:*

Copy of report by M. Mary, dated February 1865, upon the accident at the Austerlitz Bridge on 25th January 1865, during the operation of relaying the gas pipe, *App.* 346–352.

4. *Escape of Gas, and consequent Accident at the Bridge of Austerlitz Subway, in* 1864:

Correction made by M. Belgrand, in the evidence given by him in London in 1864, in regard to the reported occurrence of an explosion at the Bridge of Austerlitz in that year, *Hemans* 803–808.

Particulars relative to a serious escape of gas in the gallery on the Bridge of Austerlitz in 1864; suffocating state of the atmosphere on this occasion, notwithstanding that there were six shafts or ventilators in operation, *Belgrand* 3239–3263——Occurrence of only one explosion at the Pont d'Austerlitz, there having been also two escapes, which led to the removal of the pipes, *ib.* 3350–3354.

5. *Subway or Gallery in the Place Napoleon:*

Several years for which there has been a gas pipe in the subway at the Place Napoleon; great inefficiency of the arrangements, *Bazalgette* 685–691.

Explanation relative to the laying of gas pipes in the subway or gallery of the Place Napoleon about the year 1856; this was done against the wishes of the municipality and of the gas company, *Belgrand* 3218. 3221–3223. 3381–3383——Occurrence of an explosion in 1861 in the subway in the Place Napoleon, *ib.* 3224. 3360——Circumstance of the gas

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5. *Subway or Gallery in the Place Napoleon*—continued.

gas pipes being still retained in the Place Napoleon, whilst there has been only one explosion there, by which no one was injured, *Belgrand* 3363–3366.

Explanation of the provision made for the ventilation of the subway at the Place Napoleon Trois, in Paris; reference more especially to the character of the openings into the street, *Bramwell* 3996–4002.

6. *Subway in the Boulevard de Sevastopol:*

Insufficiency of the ventilation in the sewers in the Boulevard de Sevastopol, notwithstanding that there are several ventilating shafts, *Belgrand* 3298–3302.

7. *System of Jointing the Pipes in Paris:*

Deficient jointing of the pipes in Paris as compared with London, *Bazalgette* 769–779 —— Very defective system of jointing the pipes in Paris, *Boulnois* 1223, 1224.

Explanation of the practice adopted in Paris in the jointing of gas and water pipes; denial that the system is a very defective one, *Belgrand* 3306–3320. 3335–3362. 3367–3373.

8. *Use of the Subways or Sewers for Water Pipes:*

Satisfaction of the engineers in Paris with the condition of the water mains in the subways, *Hemans* 812——Use generally of the subways for the laying of two water mains, *ib.* 813, 814——General consent given in Paris to the use of subways for water pipes, *Boulnois* 1209, 1210——Universal use of subways or sewers in Paris for water pipes, *Bramwell* 1717.

9. *Details generally relative to the Subways or Sewers in Paris as bearing upon the Question of Liability to Gas Explosions:*

With regard to the explosions generally in the Paris subways, reasons are adduced for showing that these might easily have been prevented, and that with proper care they would not occur, *Bazalgette* 477–485——Removal of gas pipes from nearly all the subways or sewers in Paris, *ib.* 692–697——Combination in almost all cases of the sewer with the subway, *ib.* 698–702.

Omission in Paris to maintain an inspection of the subways, so as to guard against escapes of gas, *Hemans* 815, 816——Occurrence of several explosions in subways where there are no gas pipes, the gas having leaked into the subways from adjacent pipes, *ib.* 843——Exceptions taken to the view that it has been resolved not to lay gas pipes in any of the subways on account of the danger, *ib.* 882–890. 902, 903 ——Greater apprehension entertained in Paris than in London in regard to the free use of gas, *ib.* 954–957.

Timidity of French engineers in regard to placing gas pipes in subways; defective arrangements in Paris in regard to gas pipes and fittings adverted to hereon, *Bramwell* 1189–1195——Prejudged opinion upon the part of the municipal engineers in Paris against laying gas pipes in the subways there, *Boulnois* 1220–1222——Reference to the explosions in Paris, as affording no valid objection against laying gas pipes in subways, *ib.* 1231, 1232. 1271–1274——Absence of competition among the gas companies in Paris, whilst the maximum limit of price is much higher than in London, *ib.* 1311–1315.

Concession from the municipality of Paris to the gas company, by which the latter may be compelled to place their pipes in the subways or galleries; objection of the municipality to put this power in force on account of the danger, *Belgrand* 3209–3214——Occurrence of three explosions of gas in the Galeries des Martyrs about the year 1830, after which M. Mary, the chief engineer at the time, had the gas pipes taken out of the gallery, *ib.* 3215–3217. 3233–3238. 3317——Total of about 460 metres of gas pipes in the galleries on the bridges, there being no other gas pipes in subways under the control of the municipality, *ib.* 3218–3220. 3225.

Similarity between two galleries constructed in Paris in 1815 and the London subways; use of only one such gallery for gas pipes, which were removed about 1832, *Belgrand* 3226–3235——Occurrence of several explosions in sewers in Paris from escapes from gas pipes laid in the earth, *ib.* 3377, 3378——Formation of the subways or galleries in Paris of stone, those in London being built of brick, *ib.* 3384–3386——Combination of sewers and subways in Paris as regards the laying of water pipes, *ib.* 3387.

Doubt as to certain explosions in Paris affording any argument against subways, *Campbell* 4980, 4981.

Parliament-street. Necessity of a subway in such a thoroughfare as Parliament-street being equal to the whole width of the street, *Brothers* 4548. 4555. 4593. 4595. 4621–4628.

Patchett,

Patchett, Edwin. (Analysis of his Evidence.)—Solicitor at Nottingham; has taken a great interest in the introduction of subways into the town, 2277–2281. 2290. 2329——Almost unanimous feeling in the town council of Nottingham as to the advantages and the safety of subways for gas and water pipes, 2281. 2292—— Use by the gas and water companies, without objection, of the first subway made in the town, whilst they have refused to lay their pipes in two others made more recently, 2282–2286. 2308–2315.

Unanimous feeling of the Improvement Committee of the town council in favour of subways; offer by the committee to give a guarantee of indemnity to the gas company for two years if they would use the Lister Gate Subway, 2287–2301——Admission as to the Improvement Committee not having power to give a legal guarantee; belief that many of the members would, however, have given a personal guarantee, as showing their confidence in the subways, 2290. 2299. 2301–2307. 2325–2329——Great public advantage in laying pipes in subways, as obviating the breaking up of the streets, 2300.

Question considered as to the reason assigned by Mr. Hawksley for recommending the companies to use the Victoria-street Subway, though he has objected to their using those since constructed, 2316–2331——Non-payment of any rent for the use made of the Victoria-street Subway; willingness also of the town council to allow the use of the other subways free of rent, on account of the great public advantage, 2332–2338. 2343 ——Construction of third subway, though the companies had previously refused to use the second subway, the town council believing that the use of subways generally is only a question of time, 2339–2342.

Pavements. See *Openings in the Streets.*

Percy, John, M.D. (Analysis of his Evidence.)—Has had considerable experience on the subject of ventilation, 4674-4676——Believes it to be quite feasible and safe to lay gas and water mains in subways, 4677, 4678 ——Suggestion that experiments be made in the Southwark-street Subway in order to test its safety in the event of an escape of gas, 4680–4684 —— Expediency of satisfactory experiments being made before compulsory powers are given as to the use of the subways, 4682.

Opinion that under ordinary conditions ventilation by means of openings in the arch of the subways would be sufficient to prevent explosions, 4685-4691——Tendency of gas to rise through the air, though to some extent diffusion takes place, 4688. 4692——Facility of applying artificial ventilation to subways, 4691——Approval of a suggestion that there should be an incline in the arch or groove between two adjoining openings, 4692——Dissent from the view that an explosion in a subway would be a terrific one, 4693, 4694.

Actual points to be determined by the proposed experiment; opinion that it would meet most cases of leakage that might arise, 4695–4703——Belief that if an ample number of openings in the roof or arch are provided there will be little danger of any explosion from leakage, and that the provision of ventilating shafts is not necessary, 4703–4705——Varying state of the ventilation according to the temperature outside, 4705–4707——Further suggestions as to the mode in which the proposed experiment should be conducted; expediency of Mr. Ansell being present with his apparatus, 4708–4715.

Petitions. List of petitions referred to the Committee, *Rep.* iii, iv.

Phœnix Gas Company. Statement with reference to the large gas mains laid down at Vauxhall Cross; circumstance of the Phœnix Company having been required by the Metropolitan Board to put these mains in the Southwark-street Subway, *Innes* 4359–4373. 4426–4450 —— Instance of a gas explosion in the subway under the works of the Phœnix Company at Bankside, *ib.* 4380–4382. 4414–4418.

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Pipes and Mains. See *Arrangement of Pipes. Bent Pipes. Chairs or Supports. Cost. Disturbance of Pipes. Durability of Pipes. Garrick-street Subway,* 6. *Gas Pipes. Jointing of Pipes. Nottingham. Openings in the Streets. Paris. Service of Pipes. Southwark-street Subway. Vibration. Water-pipes.*

Pitchenau, Robert. (Analysis of his Evidence.)—Has worked for Messrs. Easton, Amos & Co., in the Southwark-street Subway, without experiencing any inconvenience or danger; would readily work at the laying and jointing of pipes in subways generally, 2078–2096.

Pole, William. (Analysis of his Evidence.)—Civil and mechanical engineer; has had a very large experience of gas and water works, as well as of gas explosions, 1321–1329 ——Non-occurrence of the explosion in Wood-street, Cheapside, if the gas-pipe had been in a subway, 1330–1332. 1424——Grounds for concluding also that the explosion in Oxford-street in 1863 would not have happened if a subway were used, 1333–1340——Practical experience on which witness submits that there is no appreciable leakage of gas through

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through the actual pipes, 1341–1343——Probability of the joints being better made in subways than in streets, so that subsequent leakage from the joints is very improbable, 1344–1348. 1357.

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SOUTHWARK STREET SUBWAY:

1. *Length of the Subway.*
2. *Cost.*
3. *Ventilation: Question as to its Efficiency.*
4. *Light.*
5. *Temperature.*
6. *Entrances.*
7. *Number, Size, and Arrangement of the Pipes laid in* 1864 *and recently: Conclusions as to the Space available.*
8. *Question of Leakage from the Gas Pipes: Experiments on the Subject.*
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2. *Cost:*

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Particulars relative to the experimental laying of six sets of gas pipes by witness in Southwark-street Subway in 1864, in order to prove that there was ample space for the pipes, and that no danger was involved, *R. Jones* 1546 *et seq.*——Examination, with further reference to the amount of facility in the subway for laying all the pipes that may be required; denial that serious difficulty would arise, more especially as regards connections with pipes or mains in streets at right angles, *ib.* 1626 *et seq.* 1666–1669. 1672——Further statement of the circumstances under which the pipes were laid by witness in the Southwark-street Subway, it not being in the district of the Commercial Company, *ib.* 1676–1697.

Witness, who is engineer to the Wandsworth and Putney Gas Company, laid the gas pipes in the Southwark-street Subway, *H. E. Jones* 1733–1738——Three different-sized pipes laid in the subway in 1864; very successful manner in which the operation was carried out, *ib.* 1738–1741——Superintendence also by witness in March last of the laying of 144 yards each of 18-inch pipe and nine-inch pipe; not the slightest difficulty was experienced, *ib.* 1742–1746——Disadvantage under which these pipes were laid as regards the jointing; their tightness notwithstanding, *ib.* 1776–1780——Improbability of such an accumulation of pipes in the subway as to render impracticable the substitution of a 30-inch pipe for an 18-inch pipe, if found necessary in course of time, *ib.* 1880–1886——Anticipated sufficiency of the accommodation provided in Southwark-street Subway, though a much larger space would be required in the Strand or Fleet-street, *ib.* 1910–1917.

Experimental and successful laying of some water pipes by witness; unfavourable circumstances under which this was done, *Easton* 1956. 2015–2019.

Slight importance attached to the experience hitherto derived from the use of the Southwark-street Subway, or from the experiments made, *Hawksley* 3807–3809——Further statement that the experiments in connection with the Southwark-street Subway are no practical test of its value, or of its capacity to receive conveniently all the pipes that may be required by the companies to be laid, *ib.* 3880–3885. 3906——Insufficiency of the space in the subway if it be used for pipes conveying supplies to districts beyond, *Innes* 4281–4287.

8. *Question of Leakage from the Gas Pipes; Experiments on the Subject:*

Satisfactory experiments recently made with the gas pipes in the subway, *Bazalgette* 428, 429——Perfect safety with which certain operations in connection with gas pipes in the

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8. *Question of Leakage from the Gas Pipes; Experiments on the Subject*—continued.

the subway have been carried out, *Hemans* 852–855. 859–865——Great pressure applied in order to test the soundness of the pipes laid in the subway in 1864; entire absence of any escape of gas, *R. Jones* 1561–1577——Particulars relative to experiments by witness in testing the 18-inch and 12-inch gas pipes in the subway; causes to which some diminution in the volume of gas in the pipes was owing, there having been no leakage whatever, though a very high pressure was applied, *H. E. Jones* 1764–1776.

Careful experiments recently made by witness upon the subject of gas leakage in the subway; exceedingly slight leakage even though a very high pressure was put on, *Frankland* 2151–2159. 2181–2189——Conclusion that the escape proceeded entirely from the joints, and that there is not any leakage of gas through the pipes themselves, *ib.* 2160–2165. 2183–2187. 2205——Witness concurs in the evidence of Dr. Frankland as to the innocuous leakage of gas in the Southwark-street Subway, and as to the absence practically of all danger of explosions, *Campbell* 2245 *et seq.*

Statement relative to an escape of gas in the subway when witness was there in 1864, *Greaves* 3013–3016. 3023–3029——Non-detection by witness of any leakage from the pipes in the subway, *Innes* 4505–4507.

9. *Question of Rent being paid by the Gas Company:*

Statement that the gas for the lamps in Southwark-street is supplied by the Phœnix Company through the subway; witness is not aware whether any rent is paid by that company, *R. Jones* 1676–1697——Intimation made to the Phœnix Company that they would have to pay rent for the use of the subway, *Innes* 4508–4513.

10. *Details relative to recent Experiments in order to test the Liability to Explosion from Escapes of Gas:*

Suggestion that experiments be made in the Southwark-street subway in order to test its safety in the event of an escape of gas, *Percy* 4680–4684.

Consultation of Dr. Percy by witness before commencing some recent experiments in the subway in regard to the effect of the escapes of gas, *Frankland* 4716–4718——Several persons present at the first experiments made on Saturday the 6th July, *ib.* 4719. 4722——Openings of 3-16ths of an inch and of 5-8ths of an inch made in the main on Saturday in order to ascertain the per-centage of gas in the crown of the subway, the result being that at the end of fifteen minutes the proportion was never more than 2½ per cent. *ib.* 4723–4740. 4748, 4749——Down-draught in some of the ventilators and up-draught in others during the experiments on 6th July, the gas sometimes going out by one ventilator and sometimes by another, *ib.* 4741–4747.

Mention of the several persons present at the further experiments in Southwark-street subway on Monday the 8th July; Dr. Percy was unable to attend any of the experiments, *Frankland* 4750–4761. 4794–4800——Opening of 3-8th of an inch first made in an 18-inch gas main on 8th July, the maximum per-centage of gas at the crown of the arch having been three per cent. at any time during fifteen minutes, *ib.* 4762, 4763——Lighting of a match in the subway, and also of the jet of gas from the opening in the main, without any risk of explosion having been experienced, *ib.* 4764, 4765——Subsequent opening made of an inch and a half in diameter, a light having also been applied without any tendency to explosion, *ib.* 4766–4772.

Further experiment on 8th July by making two apertures, each 1½ inches in diameter, from the two mains on opposite sides of the subway; maximum of three per cent. of gas found on this occasion between the ventilators, whilst a light was applied to one of the jets without the other igniting from it, *Frankland* 4772–4774——Escape of the gas through the ventilators as quickly as it came from the main, there having been no increased proportion in the subway after the draught through the roof had established itself, *ib.* 4775–4786.

Conclusion of the experiments by admitting into the subway all the gas that could be obtained from each pipe, *Frankland* 4787–4790——Confirmation of witness's confidence in the safety of subways by the experiments in question, *ib.* 4801–4803.

Examination as to the probable per-centage of gas near the pipe, or in other parts of the subway, when the amount was 2½ or 3 per cent. near the ventilators, *Frankland* 4804–4833. 4845, 4846——Different modes in which the gas was allowed to escape from the pipe at the different experiments, *ib.* 4834–4838——Question as to the effect of lighting the jet from the pipe in warming the subway and in causing an artificial increase of ventilation, *ib.* 4839–4856. 4870–4872.

Due instructions received from Dr. Percy before making the experiments; nothing was said about making holes in the side passages, *Frankland* 4857, 4858——Closing practically of the apertures in the side galleries at the time of the experiments, *ib.* 4861–4865——Little, if any, gas at the bottom of the subway when the escape was going on; there was not, in fact, much diffusion, *ib.* 4866–4869. 4892–4895. 4915——Slight effect of lighting the jet upon the heat or the ventilation, *ib.* 4870–4872.

Effect

SOUTHWARK STREET SUBWAY—continued.

10. *Details relative to recent Experiments in order to test the Liability, &c.*—cont^d.

Effect respectively of an escape from a small aperture in the pipe and from a larger aperture as regards diffusion through the subway or ready ascent to the roof, *Frankland* 4873–4882——Inability of witness to state the quantity of gas emitted from the holes made in the pipes, *ib.* 4888–4890——Unfavourable state of the atmosphere on the days of the recent experiments, *ib.* 4898. 4916——Necessity of double the maximum per centage of gas that was found during the experiments in order to form an explosive mixture, *ib.* 4902, 4903——Conclusion that the per centage of gas in the subway would not increase with a prolonged escape from the pipe unless some of the ventilators were closed, *ib.* 4904–4906.

Witness supplies sundry particulars in connection with some recent experiments with escapes of gas in Southwark-street subway; concurrence generally in the evidence of Dr. Frankland as to the immunity from danger shown by these experiments, *Campbell* 4636 *et seq.*——Results of the tests applied as to the per centage of gas near the ventilators throughout the experiments; absence of increase after the first fifteen minutes, *ib*, 4939–4966——Freedom from gas at the bottom of the subway at the time that it was escaping through the ventilators, *ib.* 4967–4973——Supply of the 18-inch main in the subway by an inch and a half pipe, *ib.* 4982——Statement upon the question of the atmosphere in the subway having been made very warm during the experiments, by the lighting of the jets from the pipes, *ib.* 4983–4994.

Witness in conjunction with Dr. Frankland, and after communication with Dr. Percy, has taken part in several experiments as to the result of escapes of gas in the Southwark-street subway, *Ansell* 5005–5017——Supplies sundry particulars relative to these experiments, showing the per centage of gas in the subway at different periods, after openings had been made in the gas pipe, *ib.* 5007 *et seq.*——Large jet of gas allowed to escape by means of an opening to the extent of an inch and a half; tests applied in this case by witness proving that no explosive mixture was formed in the subway, *ib.* 5042–5058——Concurrence generally in the account given by Dr. Frankland of the latest experiments made, the result being that notwithstanding the large quantity of gas allowed to escape, there was no danger of explosion, *ib.* 5059–5074.

Witness attended the recent experiments in the subway, but was not allowed to make any suggestions as to the conduct of the experiments, *Letheby* 5088–5091. 5105–5112——Submits that these experiments are by no means conclusive as to the safety of the subway, chiefly because of the very reduced pressure at which the gas escaped, so that the amount of escape was probably very limited, *ib.* 5092 *et seq.*——Artificial ventilation created in the subway by reason of the great heat from igniting some jets of gas in the first experiment, *ib.* 5097, 5098*. 5103, 5104. 5118. 5121.

Witness was present at the recent experiments in the Southwark-street subway; strong smell of gas when witness entered it, *Odling* 5138–5143——Statement to the effect that the escape of gas during the experiment was not sufficient to cause an explosive mixture, on account chiefly of the very reduced pressure, *ib.* 5144 *et seq.*——Heated state of the subway and consequent artificial ventilation through some large jets of gas having been previously lighted, *ib.* 5158, 5159.

Calculation of the quantity of gas that may have escaped during the experiments; entire inadequacy of this amount to have caused an explosion, even if there had been no ventilation whatever, *Hersey* 5192–5202. 5282–5296. 5318–5320——Circumstance of witness having suggested that an experiment should be made with an escape of gas in the side passages of the subway; facility of carrying out such experiment, *ib.* 5278–5281. 5314–5317.

11. *Other Details Generally:*

Means of obviating much of the danger incurred in respect of the service mains in Southwark-street subway, *Hemans* 866–869 —— Greater facility in reaching and repairing the sewer in Southwark-street, than if the subway had not been introduced, *H. E. Jones* 1890–1892——Any injury to the pipes through interfering with the sewer should not fall upon the gas or water companies, *ib.* 1893, 1894——Impediments to any person entering the subway for unlawful purposes, *ib.* 1895–1905.

Calculation to the effect that the bursting of a water main in the Southwark-street subway could not inundate the place so quickly as to cause the slightest danger to men at work, *Easton* 1965–1970.

Circumstance of water from the sewers rising up occasionally into the subway, *Innes* 4312–4314. 4321–4323——Supply of gas by meter to the pipes in the subway, the pipes being the property of the Local Board, *ib.* 4315–4320——Great care now taken in the use of gas in the subway, *ib.* 4329——Obstacle to laying fresh pipes in the subway after all the services with the houses on each side have been laid on, *ib.* 4330–4340——Power of witness to enter the Southwark-street subway at any time; instances of water at the bottom of the subway further adverted to, *ib.* 4464–4481.

SOUTHWARK STREET SUBWAY—continued.

11. *Other Details Generally*—continued.

Considerable difficulty, if it were necessary to replace the smaller gas pipes in the Southwark-street subway by a large one, *Brothers* 4559–4561——Obstacle to laying gas pipes in the subway on an inclination, in order to drain themselves, *ib.* 4564–4566.

Willingness of witness to remain in the subway with a nine-inch gas pipe wide open; belief that the gas would so far escape through the roof that an explosive mixture would not be formed, *Ansell* 5075–5079——Conclusion as to the safety of the subway for gas and water pipes, *ib.* 5075.

Dissent from Mr. Ansell's opinion as to the escape from a nine-inch pipe in the subway not being sufficient to cause an explosion, *Odling* 5189, 5190.

Stephenson, Robert (*the late*). Opinion of the late Mr. Robert Stephenson as to the inexpediency of subways for gas and water pipes, *Hawksley* 3858, 3859.

Strand. Way in which the large and numerous pipes in such a thoroughfare as the Strand might be removed or diverted without any insuperable impediment to the formation of a subway and the relaying of the pipes, *Easton* 2066–2075——Decided approval of a subway in old streets like the Strand, 2066–2068.

Streets and Pavements. See *Openings in the Streets.*

Suffocation of Workmen. Greater risk of suffocation of workmen in subways than in trenches, *Hersey* 5245, 5246.

Supervision. Contemplated control of the subways by the Metropolitan Board, regulations being made for the admission of the Companies' inspectors and workmen, *Hemans* 917–923——Admission that with proper control and constant supervision, the danger of subways may be reduced to a minimum, *Greaves* 3097–3101——Strict regulations and surveillance necessary, in order to prevent injury to the pipes, and to guard against careless or mischievous acts on the part of workmen, *Woodhouse* 3992–3995——Circumstance of its being provided by the Bill that the Metropolitan Board are to have the power of making bye-laws for the supervision and regulation of the subways, *Simpson* 4128, 4129——Witness sees no danger in placing gas pipes in subways, if fair precautions be taken in laying the pipes, and if proper supervision be subsequently exercised, *Frankland* 4899–4901. 4924–4935.

Clause suggested by the Committee, providing that supervision shall be provided by the Board of Works in such manner or on such terms as may be agreed upon between the Board and the Companies, *Ev. p.* 319.

See also *Inspection.* *Police.*

T.

Tarbotton, Marriott Ogle. (Analysis of his Evidence.)—Civil engineer; is surveyor for the corporation of Nottingham, 63–66——Has paid considerable attention to the question of subways, and cites several reasons for concluding that they are very advantageous for the laying of gas and water pipes, 66 *et seq.*——Advantage of subways as greatly diminishing the liability to leakage from the pipes, 69–73. 76–78——Great liability of pipes to vibration and loosening at the joints, when laid in the streets, whereas in subways this would be entirely obviated, 69–73. 76–78——Facility in subways of coating the pipes with bitumen, or other material, for preventing oxidation and decay, 74, 75.

Great improbability of any escape of gas in subways, if the pipes are carefully laid, 79——Sufficiency of the ventilation for carrying off any leakage of gas, so that explosions need not be feared, 79, 80——Facility for carrying off any leakage from the water pipes, 81——Entire absence of difficulty in connecting the pipes in subways with those in the streets, 82.

Sundry particulars in connection with the subway constructed under witness's directions in Victoria and Queen-street, Nottingham, in 1863; similarity of this subway to the one near Covent Garden, 83–105——Application made by the corporation of Nottingham to the gas and water companies to lay their pipes in the subway, such application having been complied with, and no leakage or inconvenience having since been experienced, 106–112. 126–129.

Efficient ventilation of the subway by means of iron gratings in the crown of the arch, 113. 119–121——Very uniform character of the temperature, 117, 118——Information as to the mode in which the pipes are laid in the subway, 122–125. 211–219————Arrangement in regard to any escape of water being carried into the sewers, 122.

Explanations with reference to a further subway formed in Lister Gate, Nottingham, in 1865, the length of which is about 400 feet; improved plan of construction as compared with those made in 1863; 130–142——Comment upon the refusal of the gas and water companies to lay their pipes in the Lister Gate subway; evidence of Mr. Hawksley before

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before the Committee of 1864 adverted to hereon, 143–151. 165–191——Circumstance of telegraph wires having been laid in this subway, 151–153.

Construction of a third subway, in 1866, in Market-street, the Town Council having been unanimous on the question, notwithstanding the refusal of the Companies to use the second subway, 154–156. 164. 180. 189——Plan of construction of the Market-street subway, the length being about 450 feet, and the ventilation and lighting being very efficient, 157–162.

Completion of the Lister Gate subways before the companies refused to use it; reference hereon to a letter from the gas company, dated 29th August 1865, in which the grounds of refusal are set forth, 165–186——Undertaking subsequently given by the Corporation to indemnify the gas company against all responsibility in respect of accident: further refusal, however, of the Company to use the subway, 187–195——Strong feeling of the public in Nottingham, as well as of the Corporation, in favour of subways, 189–191. 196–198——Circumstance of no application having been made by the companies to remove the pipes from the Victoria-street subway, 199, 200.

Examination with further reference to the mode of construction and arrangement of the Victoria-street subway, 201–225——Way in which the service pipes are arranged in connection with the gas and water mains in the subway, 226–240. 306, 307——Particulars showing the uniformity of the temperature in the Victoria-street subway, 241–246——Means of turning the water off from outside the subway, as well as by going into the subway, 250-257. 303–305.

Views expressed by Mr. Hawksley in 1864 upon the question of subways in Nottingham, further adverted to with reference to the subsequent refusal of the companies to use the subway in Lister Gate, 262–273. 299–302——Suggestion made by the engineer of the gas company previously to August 1865, that the pipes should be laid close to the kerbstone, 274–279——The Corporation did not demand any charge for the use of the subways, 280, 281.

Statement in further explanation of the character of the indemnity offered by the Corporation, and refused by the gas company, 283–298. 315–326——Confirmation since 1864 of the views then expressed by witness as to the success and safety of the subway in Victoria-street, 308, 309——Facility of making and using a subway, with equal safety, if five miles in length, instead of only a few hundred yards, 310——Belief as to danger not arising from carrying telegraph wires through subways where there are gas pipes, 311–314.

Justification of the indemnity offered at Nottingham, though generally the responsibility should rest upon the companies if they lay the pipes and continue in charge of them, 315–328——It was contemplated that the Corporation should have the management of the pipes, &c., if they gave an indemnity, 319. 324. 352——Belief as to an indemnity being altogether unnecessary on account of the absence practically of all danger if the pipes are properly laid, 320. 325–329.

Great improbability of any such condition of the atmosphere in subways as to prevent leakages of gas escaping through ventilators in the roof, 330–339. 353, 354——Facility of ventilating long subways, irrespectively of perforated gateways at each end, as at Nottingham, 340-343——Refusal of the water company at Nottingham, as well as the gas company, to lay their mains in the Lister Gate subway, 344-347——Way in which the mains are laid, further adverted to, 348–351.

Telegraph Wires. Belief as to danger not arising from carrying telegraph wires through subways, where there are gas pipes, *Tarbotton* 311-314——Probability of telegraph wires in subways being suspended, without being placed in pipes, *Hawksley* 3667, 3668.

Temperature. Very uniform temperature in the London subways, *Bazalgette* 764, 765——Statement showing that no objection need be apprehended as regards variation of temperature, and the effect upon water pipes, *Bramwell* 1039–1045——Data for the conclusion that variations of temperature will not affect pipes in subways so as to induce leakage, *Pole* 1358–1366——Reference to a statement of the temperature within and without the Southwark-street subway, from 2nd April to 2nd June, as showing a variation of only seventeen degrees in the subway as compared with fifty degrees outside, *Walker* 2270–2276; *App.* 323–326.

Important effect of changes of temperature in subways upon the pipes and upon leakage, *Muir* 2440——Opinion that the variation of temperature would be greater in the case of pipes buried in a subway, than in the street, *Greaves* 3092–3096——Facility of keeping the temperature in summer up to the heat outside, *Frankland* 4922, 4923.

Testing of Pipes. Want of more attention to the testing of pipes before they are laid, *Boulnois* 1227–1229——Great facility in testing in subways as compared with the present system, *H. E. Jones* 1755.

Thames Embankment Subway. Enlarged dimensions of the Thames Embankment subway, *Bazalgette* 395, 396——Way in which the subway in the Embankment is arranged with reference to the sewers, about four-fifths being now completed, *ib.* 396–398——The cost of the subway has not been estimated, *ib.* 487——Circumstance of a proposal having been made by one of the gas companies for laying pipes in the subway, *ib.* 544——Way in which the pipes might be laid in the subway, and the lateral junctions made without any any difficulty, *ib.* 545–564. 721, 722.

Statement as to the Chartered Gas Company having applied for power to lay pipes in the Embankment subway; division of opinion among the directors on the subject, witness, as engineer, being favourable to the use of the subway, *Evans* 1465. 1469–1476. 1504–1513.

Traffic. See *Openings in the Streets.*

Tramways. Advantage if there were tramways in the subways for the conveyance of the pipes after they have been let down, *Bateman* 3442–3447——Considerable obstacle to the formation and working of tramways in the subways for the conveyances of the pipes, *Hawksley* 3669–3671.

U.

Underground Railways. Effect of the Bill, if passed, in obstructing the formation of underground railways in the metropolis, *Hawksley* 3910, 3911.

Upward, Alfred. (Analysis of his Evidence.)—Is engineer at the Goswell-street station of the Chartered Gas Company; attends as a witness by a Speaker's Order, 2097–2099. 2130–2131——Erection by witness of a subway at the Goswell-street Station in 1854, in which there are several mains and service pipes, without any escape of gas having arisen, 2101–2103——Opinion that it is far safer to lay gas mains in subways than in streets, 2104. 2141, 2142.

Explanation of the apparatus invented by witness for connecting service pipes with gas or water mains without any escape of gas or water during the operation, 2105–2127. 2143–2147——Size of the subway at Goswell-street Station, and total length of pipes laid in it; inference as to the safety of subways generally, 2132–2142.

V.

Valves and Hydrants. Question considered whether there may not be much economy of space in subways as regards the valves or hydrants to be used in connection with the water mains; dissent from this view, *Hawksley* 3860–3879. 3899–3905——Witness delivers in a plan of the valves in use at Liverpool, *ib.* 3933——Concurrence with Mr. Hawksley as to its being impracticable to use certain hydrants and cocks of a diminished size, *Simpson* 4114–4123.——*See* also *Openings in the Streets.*

VENTILATION:

1. *As to the Southwark-street Subway.*
2. *As to the Garrick-street Subway.*
3. *Generally as to the Efficiency of the Means of Ventilation for carrying off Gas Leakages.*
4. *Evidence opposed to the foregoing Conclusion.*
5. *Question of Artificial Ventilation.*
6. *Proposal in regard to the Ventilation being in the hands of the Metropolitan Board.*

1. *As to the Southwark-street Subway:*

Concurrence of opinion as to the sufficiency of the existing ventilation, whilst there is every facility of providing additional ventilation, if found necessary, *Bazalgette* 440, 441. 462; *Bramwell* 1049; *Boulnois* 1240–1242. 1258; *Pole* 1367–1371——The openings are 100 feet apart, there being also ventilation by means of apertures leading in to the side galleries, *Bazalgette* 441.

Statement in further explanation of the means of ventilation in the Southwark-street subway; reference more especially to some openings made by the side of the kerb, and carried down to the side passages of the subways, *Bazalgette* 565–577——Illustration of the sufficiency of the ventilation in the subway; number and size of the gas pipes now placed there by way of experiment, *ib.* 577–596. 699——Statement as to the amount and character of the ventilation in the subway; upward current of air through the openings, *Hemans* 876. 968–978——Sufficiency of the ventilators for all practical purposes, *H. E. Jones* 1781.

Sufficiency

VENTILATION—continued.

1. *As to the Southwark-street Subway*—continued.

Sufficiency of the ventilation in the subway to carry off 100 times the present amount of leakage, so that no fear of explosion need be apprehended, *Frankland* 2163–2166 ——Tendency of any gas escaping from the pipes to rise through the atmosphere; entire adequacy of the openings provided in such cases, *ib.* 2190. 2193. 2206–2209. 2229–2237——Effect of the ventilation in the subway to cause any leakage to ascend to the roof instead of accumulating in the side galleries, *Campbell* 2249–2260——Provision of openings in some of the lateral passages in the subway, *Bazalgette* 2886. 2891–2899.

Conclusion as to the insufficiency of the means of ventilation in the subway, *Greaves* 3152–3154; *Belgrand* 3296, 3297; *Hawksley* 3776, 3777; *Simpson* 4064–4066—— Opinion that, unless by shafts not less than forty feet high, a sufficient ventilation cannot be produced in the subway from openings in the street, *Greaves* 3187–3198—Circumstance of the draught being wholly from the outside to the inside of the openings in the subway; examination hereon, *Bateman* 3424. 3430. 3517–3542. 3575–3578. 3601–3643.

Statement as to the existence of a number of openings in connection with the cellars for the houses in the streets not yet built; examination hereon as to the effect of these openings in regard to the ventilation and in accounting for a certain down draught which was otherwise inexplicable, *Hawksley* 3704–3737. 3748–3757.

Information in connection with some openings in the subway, irrespectively of the upright shafts, *Bramwell* 3758. 3763——Explanation as to the subway having originally been ventilated in two different ways, one of which has since been abandoned in favour of the other, *ib.* 3761–3765.

Further explanations relative to the ventilation and the effect produced by certain apertures before referred to, *Hawksley* 3766–3775——Insufficiency of the ventilation of the subway to prevent the formation of an explosive mixture, if there were any escape, *ib.* 4567, 4568.

Conclusion as to escapes of gas not lodging in the side galleries, *Frankland* 4883–4887——Opinion that the present ventilation of the subway is sufficient, *ib.* 4907, 4908. 4914——Increased safety if there were an opening at the summit of each of the side galleries, *ib.* 4911–4914——Upward draught through the ventilators formerly in the subway upon a certain occasion when witness tested them; the entrance door was probably open at the time, *ib.* 4917–4921.

2. *As to the Garrick-street Subway:*

Provision of ventilators in the roof of the subway about eighty feet apart, *Bazalgette* 387. 441——Conclusion as to the adequacy of the ventilation, *Boulnois* 1240, 1241; *Pole* 1370, 1371——Vertical openings into the roadways by which the subway is ventilated; their sufficiency, *Marrable* 1709–1715.

Variable ventilations in the Garrick-street subway, *Muir* 2441–2444——Want of ventilation of the side passages, *ib.* 2456, 2457——Recent inspection by witness of the subway near Covent Garden, the result being that there was no ventilation whatever in it, nor are the small openings capable of giving ventilation, *Forster* 2602–2636. 2651–2653. 2707–2724——Entire absence of ventilation in the side galleries of the subway, *ib.* 2648, 2649.

Openings can easily be placed in the side passages, *Bazalgette* 2900——Belief as to the adequacy of the ventilation in the subway, even though a constant current of air through the openings may not be provided, *ib.* 2903–2908.

Absence of any sensible ventilation in the Garrick-street subway when inspected by the present committee, *Hawksley* 3704——Conclusion as to the insufficiency of the ventilation, *Brothers* 4531–4542.

3. *Generally as to the Efficiency of the Means of Ventilation for carrying off Gas Leakages:*

Great improbability of any such condition of the atmosphere in subways as to prevent leakages of gas escaping through ventilators in the roof, *Tarbotton* 330–339. 353, 354 —— Facility of ventilating long subways irrespectively of perforated gateways at each end, as at Nottingham, *ib.* 340–343——Belief as to the sufficiency of the means of ventilation in the present subways, there being, moreover, every facility of multiplying the ventilating shafts, *Bazalgette* 440, 441. 462 —— Provision of openings in the subways through which any leakage of gas would escape, *Bramwell* 1049——Further conclusion as to the adequacy of ventilators in the roof for carrying off escapes whether from loose joints or from wilful fractures, *ib.* 1108–1115.

Sufficiency of the means of ventilation in the existing subways in London; facility of providing increased ventilation, *Boulnois* 1240–1242. 1258——Current of air down some of the ventilators whilst there is an up current through others, *ib.* 1278–1281——Adequacy of

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3. *Generally as to the Efficiency of the Means of Ventilation, &c.*—continued.

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1. *Evidence favourable to Subways for Water Pipes.*
2. *Evidence to a contrary purport.*

1. *Evidence favourable to Subways for Water Pipes:*

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WATER PIPES—continued.

1. *Evidence favourable to Subways for Water Pipes*—continued.

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3979——Inefficiency of natural ventilation for rendering the subways safe, 3945. 3968. 3980–3989——Necessity of a high shaft or chimney for each subway if isolated, 3949. 3954–3960——Suggestions as to the mode of ventilating the side passages in the event of artificial ventilation being adopted, 3951–3954——Sufficiency of one exhausting establishment and one shaft, if all the subways in London were to converge towards one centre, 3957–3960.

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TO THE

MINUTES OF EVIDENCE

TAKEN BEFORE THE

SELECT COMMITTEE

ON

METROPOLIS SUBWAYS BILL.

Ordered, by The House of Commons, *to be Printed,*
30 *July* 1867.

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REPORT

FROM THE

SELECT COMMITTEE OF THE HOUSE OF LORDS,

ON THE

TRAFFIC REGULATION (METROPOLIS) BILL [H.L.];

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND INDEX.

Ordered, by The House of Commons, *to be Printed,*
2 *April* 1867.

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MINUTES OF EVIDENCE - - - - - - - p. 1
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REPORT.

BY THE SELECT COMMITTEE on "The Traffic Regulation (Metropolis) Bill [H. L.];" and to whom were referred several Petitions relating to the subject-matter of the Inquiry; and to Report to The House:—

ORDERED TO REPORT,

That the Committee have met, and considered the said Bill, and also the said Petitions, and have ordered the said Bill to be reported to your Lordships, with some Amendments; and the Committee have directed the Minutes of Evidence taken before them to be laid before your Lordships.

8th March 1867.

ORDER OF REFERENCE.

Die Martis, 12° *Februarii*, 1867.

Read 2^{a} (according to Order), and referred to a Select Committee.

Die Jovis, 14° *Februarii*, 1867.

Select Committee, to be named To-morrow.

Die Veneris, 15° *Februarii*, 1867.

The Lords following were named of the Select Committee: The Committee to meet on Tuesday next, at Twelve o'clock; and to appoint their own Chairman:

Lord Privy Seal.
Lord Steward.
Earl of Tankerville.
Earl Graham.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl Granville.
Earl of Kimberley.
Lord Methuen.
Lord Stanley of Alderley.
Lord Houghton.

Die Lunæ, 18° *Februarii*, 1867.

The Marquess of *Westmeath*, The Earl of *Airlie*, and The Earl *Stanhope* added to the Select Committee, and the Committee to meet To-morrow, at half-past Four o'clock instead of Twelve o'clock.

Die Martis, 19° *Februarii*, 1867.

The Evidence taken before the Select Committee from time to time to be printed for the use of the Members of this House; but no copies thereof to be delivered, except to the Members of the Committee, until further Order.

The Lord *Portman* and The Lord *Ebury* added to the Select Committee.

Petitions referred to the Committee: February 18, 19, 21, 22, 25; March 5, 7.

LORDS PRESENT, AND MINUTES OF PROCEEDINGS AT EACH SITTING OF THE COMMITTEE.

Die Martis, 19° *Februarii*, 1867.

LORDS PRESENT:

Lord Privy Seal.
Marquess of Westmeath.
Earl of Tankerville.
Earl Graham.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl Granville.
Earl of Kimberley.
Lord Methuen.
Lord Stanley of Alderley.

Order of Reference read.

Order of the House of Friday last, empowering the Committee to appoint their own Chairman, read.

It is proposed, That the Earl of *Belmore* do take the Chair.

The same is agreed to, and the Earl of *Belmore* takes the Chair accordingly.

Order of the House of yesterday, referring to the Committee the Petitions of the Surrey Commercial Dock Company; and of Traders and others using the Surrey Commercial Docks, praying to be heard by Counsel against the Bill; and also a Petition of Coal Merchants and Brewers, &c., of London, for the Amendment of the Bill, read.

Order of the House of yesterday, adding the Marquess of *Westmeath*, the Earl of *Airlie*, and the Earl *Stanhope* to the Committee, read.

The course of proceeding is considered.

The Petitioners praying to be heard by Counsel against the Bill are called in, and Mr. *Newall*, the Agent for the Petitioners, is heard to ask the Committee to allow the Petitioners to appear by Counsel.

The Parties are directed to withdraw, and after discussion are called in, and informed that the Committee will permit the Petitioners to appear by themselves and their Agents, but not by Counsel.

Ordered, That the Committee be adjourned till Thursday next, One o'clock.

Die Jovis, 21° *Februarii*, 1867.

LORDS PRESENT:

Lord Steward.
Earl of Airlie.
Earl of Tankerville.
Earl Stanhope.
Earl Graham.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl Granville.
Earl of Kimberley.
Lord Methuen.
Lord Stanley of Alderley.
Lord Houghton.

The Earl of BELMORE in the Chair.

Order of adjournment, read.

Order of the House of Tuesday last, referring to the Committee a Petition of Brewers and Distillers of London, praying to be heard by Counsel against Clause 6 of the Bill, read.

Order of the House of Tuesday last, that the Evidence taken before the Select Committee from time to time be printed for the use of the Members of this House, but that no copies thereof be delivered, except to the Members of the Committee, until further order, read.

Order of the House of Tuesday last, adding the Lord *Portman* and the Lord *Ebury* to the Committee, read.

The Proceedings of the Committee of Tuesday last are read.

The following Witness is called in, and examined (*vide* the Evidence), viz.:—Sir *Richard Mayne*, K.C.B.

Ordered, That the Committee be adjourned till To-morrow, One o'clock.

Die Veneris, 22° *Februarii*, 1867.

LORDS PRESENT:

Lord Steward.	Earl Granville.
Earl of Airlie.	Earl of Kimberley.
Earl Stanhope.	Lord Methuen.
Earl of Lucan.	Lord Stanley of Alderley.
Earl of Belmore.	Lord Ebury.
Earl De Grey.	Lord Houghton.

The Earl of BELMORE in the Chair.

Order of adjournment read.

Order of the House of yesterday, referring to the Committee a Petition of the Great Eastern Railway Company, praying to be heard by Counsel against Clause 6 of the Bill, read.

The Proceedings of the Committee of yesterday are read.

The following Witnesses are called in, and examined (*vide* the Evidence), viz.:—Colonel *James Fraser*, Mr. *Robert Hanbury*, Mr. *Alexander Fraser*, and Mr. *Thomas Coxon*.

Ordered, That the Committee be adjourned till Monday next, One o'clock.

Die Lunæ, 25° *Februarii*, 1867.

LORDS PRESENT:

Marquess of Westmeath.	Earl De Grey.
Earl of Airlie.	Earl Granville.
Earl Stanhope.	Earl of Kimberley.
Earl of Lucan.	Lord Methuen.
Earl of Belmore.	Lord Stanley of Alderley.

The Earl of BELMORE in the Chair.

Order of adjournment read.

Order of the House of Friday last, referring to the Committee a Petition of the Metropolitan Board of Works, respecting the streets of the Metropolis (presented on Thursday last), read.

The Proceedings of the Committee of Friday last are read.

The following Witnesses are called in, and examined (*vide* the Evidence), viz.:—Mr. *George Locket*, Mr. *Arthur Stevens Davey*, Mr. *James John Miller*, Mr. *Josiah Griffin*, Mr. *Daniel Norton*, Mr. *John Bulmer*, Hon. *Ashley Ponsonby*, Mr. *Robert Richard Arntz*, and Mr. *William Howard*.

Ordered, That the Committee be adjourned till To-morrow, One o'clock.

Die Martis, 26° *Februarii*, 1867.

LORDS PRESENT:

Earl of Airlie.
Earl Stanhope.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl of Kimberley.
Lord Methuen.
Lord Stanley of Alderley.

The Earl of BELMORE in the Chair.

Order of adjournment read.

Order of the House of yesterday, referring to the Committee a Petition of the Mayor, Aldermen. and Commons of the City of London, praying to be heard by Counsel against the Bill, read.

The Proceedings of the Committee of yesterday are read.

The following Witnesses are called in, and examined (*vide* the Evidence), viz., Mr. *William Howard* further examined, and Mr. *Thomas Cane.*

Ordered, That the Committee be adjourned till Thursday next, One o'clock.

Die Jovis, 28° *Februarii*, 1867.

LORDS PRESENT:

Lord Steward.
Earl of Airlie.
Earl of Lucan.
Earl of Belmore.
Earl de Grey.
Earl of Kimberley.
Lord Stanley of Alderley.
Lord Houghton.

The Earl of BELMORE in the Chair.

Order of adjournment read.

The Proceedings of the Committee of yesterday are read.

The following Witnesses are called in, and examined (*vide* the Evidence), viz., Mr. *Henry de Jersey*, Mr. *Benjamin Field*, Mr. *James Renat Scott*, Mr. *Seymour Clarke*, Mr. *Charles Mason*, Mr *William Smith*, Mr. *Henry Hambleton.*

Ordered, That the Committee be adjourned till To-morrow, One o'clock.

Die Veneris, 1° *Martii*, 1867.

LORDS PRESENT:

Lord Steward.
Marquess of Westmeath.
Earl of Airlie.
Earl Stanhope.
Earl Graham.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl of Kimberley.
Lord Methuen.
Lord Stanley of Alderley.

The Earl of BELMORE in the Chair.

Order of adjournment read.

The Proceedings of the Committee of yesterday are read.

The following Witnesses are called in, and examined (*vide* the Evidence), viz., Mr. *Seymour Clarke* further examined, and Mr. *James Howell.*

The Title of the Bill is read, and postponed.

The Preamble of the Bill is also read, and postponed.

Clauses 1 to 5, both inclusive, are read, and Amendments made therein.

Clause 6 is read, and it is proposed, by the Lord *Stanley of Alderley*, to insert (except such as can be delivered by hand) after (casks) in line 1 of the clause.

Objected to. On Question that the words be inserted:

Content.	Not Content.
Lord Steward.	Earl of Airlie.
Lord Methuen.	Earl Stanhope.
Lord Stanley of Alderley.	Earl Graham.
	Earl of Lucan.
	Earl of Belmore.
	Earl De Grey.
	Earl of Kimberley.

Clause 6 is again read, and Amendments are made therein.

It is then moved to resolve, by the Earl De Grey, "That as to casks, this clause should apply only to such as are lowered by ropes, chains, or machinery across the pavement."

The same is agreed to.

Clauses 7 to 12, both inclusive, are read, and Amendments made therein.

Clause 13 is then read, and it is proposed by the Chairman to leave out paragraph 2 of the clause.

Objected to. On Question that paragraph 2 stand part of the clause:

Content.	Not Content.
Marquess of Westmeath.	Lord Steward.
Earl Stanhope.	Earl of Airlie.
Earl of Lucan.	Earl Graham.
Lord Stanley of Alderley.	Earl of Belmore.
	Earl De Grey.
	Earl of Kimberley
	Lord Methuen.

Clause 13 is again read, and Amendments are made therein.

A clause is then proposed by the Marquess of *Westmeath*, and after discussion is withdrawn.

Clauses 14 to 18, both inclusive, are read, and Amendments made therein.

Clause 19 is read, and it is proposed by the Earl of Kimberley to leave out (three clear days) in line 7 of the Clause.

Objected to. On Question, That the words proposed to be left out stand part of the Clause:

Content.	Not Content.
Lord Steward.	Earl of Kimberley.
Earl Stanhope.	Lord Methuen.
Earl de Grey.	
Lord Stanley of Alderley.	

It is then proposed by the Lord Stanley of Alderley to leave out (or attacked) in lines 12 and 13 of the Clause:

Objected to. On Question, That the words proposed to be left out stand part of the Clause:

Content.	Not Content.
Earl Stanhope.	Lord Steward.
Earl of Kimberley.	Earl of Belmore.
Lord Methuen.	Earl de Grey.
	Lord Stanley of Alderley.

The remaining Clauses of the Bill are read, and Amendments made therein.

Ordered, That the Committee be adjourned till Friday next, One o'clock.

Die Veneris, 8° *Martii*, 1867.

LORDS PRESENT:

Earl Stanhope.
Earl Graham.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl Granville.
Earl of Kimberley.
Lord Methuen.
Lord Stanley of Alderley.
Lord Houghton.

The Earl of BELMORE in the Chair.

Order of adjournment read.

Order of the House of Tuesday last, referring to the Committee a Petition of the Vestry of Saint Mary Abbott, Kensington, praying to be heard by Counsel against the Bill; and also a Petition of the Vestry of Bermondsey, against the Bill, read.

Order of the House of yesterday, referring to the Committee a Petition of the Metropolitan Board of Works, praying to be heard by Counsel against the Bill; and also a Petition of Coal Owners and others, for the amendment of the Bill, read.

The Proceedings of the Committee of Friday last are read.

The Bill, as re-printed with the Amendments, is laid before the Committee by the Chairman.

The same is considered, and several further Amendments are made therein.

Clause 6 is read, and it is proposed by the Chairman to leave out (Twelve), in line 1 of the Clause, and to insert (Six) in lieu thereof.

Objected to.

On Question, That this Amendment be agreed to:

Content.	Not Content.
Earl Stanhope.	Earl of Kimberley.
Earl Graham.	Lord Methuen.
Earl of Lucan.	Lord Stanley of Alderley.
Earl of Belmore.	Lord Houghton.
Earl De Grey.	
Earl Granville.	

Clause 11 is read, and it is proposed by the Lord *Houghton* to leave out (or being on foot), in line 4 of the Clause.

Objected to. On Question, That the words proposed to be left out stand part of the Clause:

Content.	Not Content.
Earl Stanhope.	Lord Houghton.
Earl Graham.	
Earl of Lucan.	
Earl of Belmore.	
Earl De Grey.	
Earl Granville.	
Earl of Kimberley.	
Lord Methuen.	
Lord Stanley of Alderley.	

The remaining Clauses of the Bill are severally read, further Amendments are made therein, and the same, as amended, are agreed to.

The Schedules to the Bill are read, Amendments are made therein, and the same, as amended, are agreed to.

The Preamble of the Bill is again read, and is agreed to.

The Title of the Bill is also again read, and is agreed to.

Ordered, That the Lord in the Chair do report the Bill, with the Amendments thereto, to the House.

MINUTES OF EVIDENCE.

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Die Jovis, 21° *Februarii* 1867.

PRESENT:

LORD STEWARD.	Earl DE GREY.
Earl of AIRLIE.	Earl GRANVILLE.
Earl of TANKERVILLE.	Earl of KIMBERLEY.
Earl STANHOPE.	Lord METHUEN.
Earl GRAHAM.	Lord STANLEY OF ALDERLEY.
Earl of LUCAN.	Lord HOUGHTON.
Earl of BELMORE.	

THE EARL OF BELMORE, IN THE CHAIR.

SIR RICHARD MAYNE, K.C.B., is called in; and Examined as follows:

Evidence on the Traffic Regulation (Metropolis) Bill.

Sir *R. Mayne*, K.C.B.

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1. *Chairman.*] YOU are the Commissioner of Police of the Metropolis?
Yes.

2. You have held that office for a considerable length of time?
Ever since its formation, in 1829.

3. You are therefore acquainted with the traffic of the metropolis, and with the conditions under which it is carried on?
Yes; necessarily, from the duties of police, and the various representations made to me, as well as the special powers which the Commissioner of Police has to enforce.

4. You were examined before a Committee of the House of Commons in March last year, on the City Traffic Regulation Bill?
I was.

5. Can you state the several Acts of Parliament for the regulation of public carriages, omnibuses and cabs, and drivers and conductors?
The first Act is the 1st and 2nd of William the Fourth, c. 22, for the licensing of the several hackney carriages. Then there is the 6th and 7th of Victoria, c. 86, "An Act for regulating Hackney and Stage Carriages in and near London." At that time, by the 6th and 7th of Victoria, c. 86, there was a Registrar appointed for carrying out the laws; that office was abolished, and the duties were transferred to the office of the Commissioner of Police, by an Act of the 13th year of the present Queen, c. 7.

6. In what year was that?
In 1850. The principal Acts, if not the only ones, subsequent to that are the 16th and 17th of the present Queen, c. 33 and c. 127 of the same year.

7. What are those Acts familiarly called?
The first is familiarly called "An Act for regulating the Hackney and Stage Carriages of the Metropolis," and the second is for the repeal of duties, and granting new duties upon licensing. Also under that Act an alteration was made, by which a license was granted for six days only, exclusive of Sunday. The duty is 1*s.* a day; for the seven days it was 7*s.*; for the six days, exclusive of Sunday, it was 6 *s.* I think that those are all the Acts relating to the subject.

8. You have, I believe, as Commissioner of Police, special powers given you for

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for regulating the traffic. Will you explain to the Committee shortly what those powers are?

In the Act of the 2nd and 3rd of the present Queen, c. 47, intituled, "An Act for further improving the Police in and near the Metropolis," there is by Section 52 the following power given: "It shall be lawful for the Commissioners of Police from time to time, and as occasion shall require, to make regulations for the route to be observed by all carts, carriages, horses, and persons, and for preventing obstruction of the streets and thoroughfares within the Metropolitan Police District, in all times of public processions, public rejoicings, or illuminations; and also to give directions to the constables for keeping order, and for preventing any obstruction of the thoroughfares in the immediate neighbourhood of Her Majesty's Palaces and the Public Offices, the High Court of Parliament, the Courts of Law and Equity, the Police Courts, the Theatres, and other places of public resort, and in any case when the streets or thoroughfares may be thronged or may be liable to be obstructed." There are other clauses, but they are of a minor character: there is, for instance, the 51st clause, for making regulations on Sunday for the passage of carriages near any church. There is also the Metropolitan Market Act of 1857, the 20th and 21st of Victoria, c. 135, a Local Act, giving the Commissioners of Police power, with the approval of the Secretary of State, to make regulations as to the hours and routes by which cattle may be driven through the streets to and from the Metropolitan Market. There are various clauses in the Act of the 2nd and 3rd of Victoria, c. 47, which relate to traffic; as for instance, Section 54, the first paragraph of which is "Every person who shall, to the annoyance of the inhabitants or passengers, expose for show or sale (except in a market lawfully appointed for the purpose), or feed or fodder any horse or other animal, or show any caravan containing any animal, or any other show, or public entertainment, or shoe, bleed, or farry any horse or animal (except in cases of accident), or clean, dress, exercise, train, or break any horse or animal, or clean, make, or repair any part of any cart or carriage, except in cases of accident where repair on the spot is necessary." The next paragraph is, "Every person who shall turn loose any horse or cattle, or suffer to be at large any unmuzzled ferocious dog, or set on or urge any dog or other animal to attack, worry, or put in fear any person, horse, or other animal." Paragraph 4 is, "Every person having the care of any cart or carriage, who shall ride on any part thereof, on the shafts, or on any horse or other animal drawing the same, without having and holding the reins; or who shall be at such a distance from such cart or carriage as not to have the complete control over every horse or other animal drawing the same." Paragraph 5 is, "Every person who shall ride or drive furiously, or so as to endanger the life or limb of any person, or to the common danger of the passengers in any thoroughfare." Paragraph 6 is, "Every person who shall cause any cart, public carriage, sledge, truck, or barrow, with or without horses, to stand longer than may be necessary for loading or unloading, or for taking up or setting down passengers, except hackney carriages standing for hire in any place not forbidden by law; or who, by means of any cart, carriage, sledge, truck, or barrow, or any horse or other animal, shall wilfully interrupt any public crossing, or wilfully cause any obstruction in any thoroughfare." The next paragraph is, "Every person who shall lead or ride any horse or other animal, or draw or drive any cart or carriage, sledge, truck, or barrow, upon any footway or curbstone, or fasten any horse or other animal so that it can stand across or upon any footway." There are various details.

9. I believe that there are similar provisions by law as applicable to the City of London?

Exactly. The City Police Act, in these respects, is a copy of this Act, with this exception, however, that in many of the cases the City Commissioner of Police has only power with the consent of the Court of Mayor and Aldermen; and in other cases, if I remember rightly, the Court of Mayor and Aldermen must originate the regulations. The Court of Mayor and Aldermen have certain powers of directing the Commissioner of Police.

10. Have you examined the Bill which is referred to the Committee?

I have.

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11. Do you know why the limits of the first part of it are fixed, as stated in Section 3, at a circle with radii of four miles from Charing Cross?

I have brought down a map on which the radius is marked. The whole map shows the district of the Metropolitan Board of Works.

12. Do you know why this radius was fixed upon in this Bill?

I believe that it was taken, first of all, because that it comprises within it all the most crowded streets of the metropolis, including, of course, the City; and likewise it is the district assigned in regulating the fares of hackney carriages, by the 16th and 17th of Victoria, c. 33.

13. Earl *Granville*.] Have you any jurisdiction in the City?

None whatsoever.

14. *Chairman*.] Are you able to state the number of accidents which have caused loss of life and serious injury to persons in the streets during the last year?

According to a Return made to each House of Parliament in March 1866, the number run over and killed were 140; the number maimed or injured were 1,707; the vehicles are given in the Return.

15. Lord *Stanley of Alderley*.] Can you distinguish by what sort of carriages those accidents have happened, how many by hackney carriages, and how many by vans, and omnibuses, and carts?

The Return does not distinguish which were by cabs and which by private carriages. The accidents are occasioned by carts; butchers' carts, for instance, light carts, and public carriages. I believe that there are very few by private carriages.

16. What numbers are there by carts and carriages?

Those are all by carts and carriages; but there is this distinction, the number of cases in which carriages were driven were 124, and the number in which the horses were led were 16. There is a distinction taken between the numbers killed and maimed. Of those killed, 124 were by carriages being driven at the time, and 16 were cases in which horses were led.

17. Would not those include the whole of the injuries which were occasioned by the heavy traffic of brewers' carts, and so on?

No; I refer to deaths. I will give the particulars of the injuries immediately. The number of cases in which the carriages were driven, where injuries were caused to persons who were not killed, were 1,647.

18. That is out of the 1,707?

Yes, and there were 60 cases in which horses were led.

19. Earl *De Grey*.] When you say "carriages driven," does that include heavy carts?

Yes; anything driven from a box; many vehicles are now driven from a box, where formerly the horses were led; and they are a very dangerous class of vehicles.

20. Lord *Stanley of Alderley*.] Does this return show the number of accidents caused by the carriages chiefly affected by this Bill, such as brewers' carts, and coal carts, and so on?

Yes; the number of cases in which horses are driven include the heavy traffic of, for instance, brewers' carts; the men sit on the shafts and drive in a most dangerous manner.

21. It is desirable that the Committee should know what proportion of the number of these accidents has been caused by the carriages for which we are chiefly to legislate by this Bill?

I cannot speak positively, but I believe that a very great proportion, both of the deaths and of the injuries, were caused by vehicles with what one may call heavy traffic.

22. And not by butchers' carts and other vehicles of that description, which are driven rapidly through the streets?

No; I believe there have been very few of those cases, for although they drive at a most rapid and a most dangerous pace, yet they are usually at an early hour in the morning when there is full light, and in a part of the town not so much frequented.

23. Earl *Granville*.] Can you state the approximate proportion of accidents which arise from the stupidity or carelessness of the foot passengers?
No; many accidents are caused in that way, and some by persons being in a half-intoxicated state.

24. Earl *Graham*.] A great number of persons are deaf and blind, they do not look out for the carriages; and they run straight under the horses' legs?
Yes, but those persons who are blind, I believe, usually have somebody to lead them.

25. Some are partially blind?
Yes.

26. Lord *Methuen*.] Can you give any idea of the number of children, and the number of the adult population, to whom that return applies?
No.

27. *Lord Steward*.] Does the return make any distinction between men and women?
It does not.

28. Lord *Stanley of Alderley*.] Am I to understand you to say that the greatest proportion of those persons who were killed either by carriages driven, or by horses led, and the greatest proportion of those persons who were injured, were injured by vehicles, carrying the heavy traffic which is proposed to be dealt with by this Bill?
I am not able to say that.

29. Nor can you state what proportion?
I cannot.

30. Can you ascertain it.
I doubt it, because a great many of these returns are taken from the inquiries at hospitals.

31. Is it not mentioned by what species of carriage the accidents have occurred?
No, they are merely given as cases of injury by persons being run over; I am not aware that there is any mode by which that could be ascertained, even with tolerable accuracy, or an approach to accuracy.

32. *Chairman*.] Have you had frequent complaints during the past year, of obstructions in the thoroughfares?
Very frequent, and they are increasing.

33. Do you find it possible with the present laws to provide a remedy?
Certainly not.

34. Earl *Graham*.] There are certain places where, under any regulation, unless you prevent all waggons and all carts going in the middle of the day, you must have obstruction; for instance, at the bottom of Ludgate-hill, at the crossing from Blackfriars Bridge, there is a constant stream which prevents your passing sometimes for two or three minutes, whichever way you are going?
Some delay must of necessity be caused, but I take it that the great object in this Bill, and I should think it a necessary ingredient in any such Bill, must be to diminish the number of vehicles as far as possible going through the streets, in the crowded parts of the day.

35. I do not think that this Bill does that?
The object would be effected to a great degree by, for instance, preventing the delivery of casks of beer, and the delivery of coals between certain hours; all those would be taken out of the streets.

36. I have been along the Strand and Fleet-street nearly every day, and I have never seen a coal cart delivering coals during the day?
I have been told that they are not delivered within the City in those hours, and

and therefore in the City they effect that which this Bill is intended to effect elsewhere.

37. *Chairman.*] From your experience, do you believe that it would be possible to provide a remedy for these obstructions, without imposing certain restrictions on some branches of trade and business?

I am quite sure (and I have tried it in a variety of ways as far as I have power, or can exercise any power which I have) that it cannot be effected in any other way. Great obstruction must be caused to everybody, and great delay must be caused to everybody, putting aside even the question of accidents, unless you reduce the number of vehicles in the streets; and the whole question, I believe, is the greater convenience or inconvenience which you occasion, and whether by restricting certain branches of trade you give such an amount of public convenience as will counterbalance and outweigh the inconvenience to those trades, or rather to the persons who are concerned, not in the trade, but in receiving the goods. For instance, with regard to coals, I should say that it was a very small inconvenience to the coal owner; he of course must charge more if he is put to more expense, and we who consume coals must be the sufferers; and so with regard to beer and wines.

38. Earl *Graham.*] There are a great number of other vans which stop the way: for instance, railway vans, and vans with sacks of flour, and sacks of wool, all of which go along the main thoroughfares?

There are; but there are clauses in this Bill, when you come to the special limits, in which regulations to any amount of stringency might be made applicable to such cases as your Lordship mentions; there is, for instance, Section 9.

39. *Chairman.*] Will you refer to the provisions in Sections from 5 to 11, and explain the present law applicable to each case?

Section 5 is new, and it would prohibit scavengers' work from being done between the hours of 10 in the morning and 7 in the evening; and, therefore, it must be done within the hours between 7 in the evening and 10 in the morning. I was told before the Committee of last year by an alderman who was present, that that is now done within the City of London. I believe that it is done in many Continental cities; I believe that it is so in Paris. The inconvenience of the scavenger's work must be patent to us all, for there are great heavy carts with quantities of mud shovelled into them as you pass along, and a very great amount of nuisance, as well as obstruction, is caused by it.

40. *Lord Steward.*] Have the City of London any regulations connected with their traffic?

Colonel Fraser, who is here, will be able to explain that better than I can; but I have heard that many regulations are made in the City of London for which there is no real law, but which are submitted to there as customs, from a feeling of general convenience.

41. Lord *Stanley of Alderley.*] Is it not the fact that, by a Bill passed last year, most of the regulations proposed in this Bill, already exist in the City of London?

No, that Bill was stopped in Committee; there was a Bill in a previous Session, but there are very few provisions in it of any value. The authorities submitted various provisions to Sir George Grey, the Secretary of State, but they were all, with the exception of very few, refused.

42. Is it not the fact, that already no waggon, cart, van, carriage, or other vehicle, is allowed to deliver coals, beer, wine or other liquid in casks, at any hours except between five o'clock in the evening and nine in the morning?

I believe not.

43. Is it not so by the bye-laws made by the City of London?

These are the only bye-laws, which were made in the year 1863: the first of which is, "Every omnibus, metropolitan stage carriage, van, or other carriage licensed for the conveyance of passengers at separate fares, passing eastwards through St. Paul's Churchyard, and proceeding to, or whose destination, as stated

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stated on such vehicle, shall be London Bridge, shall pass down Cannon-street, and thence over London Bridge."

44. Will you look at Clause 6 in those bye-laws?
There is no such bye-law.

45. What are these bye-laws in the Appendix to the Report of the Committee of the House of Commons of last year?
Those were not approved; they were not considered to be within the provisions of the Act. The next bye-law is, "No person shall drive any cart, waggon, dray, or other vehicle between the hours of nine in the morning and six in the evening, laden to a greater height than 16 feet." And there is a provision that no timber beyond a certain length shall go between certain hours.

46. *Chairman.*] Returning to the 5th clause of the present Bill; do you think that it would be possible to restrict the hours for sweeping and cleaning the streets, to those which are proposed in this clause?
I imagine that there would be no difficulty in it whatsoever. You would employ a certain number of persons to do the work early in the morning, or late at night. I spoke to the prefect in Paris about it, and he found no difficulty; he required a great deal of the work to be done at night.

47. Earl of *Lucan.*] Are these hours the same as the French hours?
I am not aware of that.

48. Earl of *Airlie.*] But the difficulty here is greater in dealing with the traffic than it is in Paris?
Yes, and therefore there is the more stringent necessity for regulation; our streets also are generally much narrower.

49. Lord *Methuen.*] I understand you that in Paris they work through the night?
They do to a very great extent; some of your Lordships perhaps may remember that formerly there was a class of scavengering done by what were called nightmen, who were only allowed to work at night; for instance, cesspools and all such things were only emptied at night; by the New Drainage Act that is now not of so much importance, but there this principle was exactly carried out.

50. *Chairman.*] Will you look at Clause 6, and explain to the Committee the reasons which you have for thinking it necessary that some such provision should be made?
The actual state of things is that a great waggon, a coal waggon (to begin with coals), draws up, taking in a narrow street nearly the whole of the roadway. If the horses are taken out, which they seldom are, there is the length of the waggon, and the coals are then shot in through a hole in the street, making an obstruction of the footway as well; that is with regard to coals; the inconvenience of that I should submit is obvious. So likewise with regard to casks, with this aggravation; that casks are let down by ropes which cross the footway; the waggon stands with its casks in the street, and there are ropes to the cellar, crossing the whole of the footway; the casks are let down in that manner, and they are usually drawn up by drawing the horse in the waggon forward, so that the end of the rope obstructs not only the footway but a part of the street while each cask is drawn up; that is the actual practice now in the delivery of heavy casks of beers and wines and such things.

51. Do you know whether any accidents are caused by that mode of proceeding?
I am not aware of accidents being caused by it; there is a very great amount of inconvenience; almost everybody has to pass out into the middle of a dirty street.

52. Lord *Stanley of Alderley.*] Is it your opinion that this regulation could be enforced without producing very considerable difficulties on the part of the deliverers of coal, and also on the part of the deliverers of spirits and beer to publicans?
I cannot judge of the amount of inconvenience, but I have known so many cases in which I was told that things were impossible, and which I have found, when

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when the law was compulsory, were quite possible, that I do not entirely consider that a case is made out by the mere assertion that the thing is impossible; for instance, when the Act for the abatement of the smoke nuisance was passed. I was told that it was impossible, and that it could not be carried out. When the Act for the regulation of cattle passing through the streets was passed, I remember that a deputation of the cattle salesmen and drovers, and persons of that description, came to me and represented that it was impossible, and that I should raise the price of meat to 1 *s.* 6 *d.* and 2*s.* 6*d.* per pound, and so on. There are various laws which I was told would be impracticable when they were about to be passed, but which, in operation, have been found not to be so.

53. But is it not obvious that, in order to perform the same amount of labour, it would be necessary both for the brewers and for the persons delivering coals to keep a much greater number of horses and carriages, and a much larger staff to do that in a few hours which they now do in a longer time?

I suppose so, for which I presume the public would pay.

54. Which would ultimately considerably enhance the cost to the consumer?

Yes; it is a question of relative convenience and inconvenience; the public gain a great convenience, and, on the other hand, they must pay for it.

55. You admit that considerable inconvenience would be occasioned, and that considerable additional cost would be imposed upon the parties receiving these casks of beer, and so on?

Yes; I of course do not understand the trade. There would be some increase of cost as a necessary consequence (to what extent I cannot say), unless some new arrangements were found out.

56. Would it not, particularly in the winter time, make it necessary for the dealers in these articles to begin loading their waggons and carts almost in the dark, or else to be almost unable to perform this service?

I believe that it must be so.

57. Lord *Houghton.*] Is it not the fact that the greater part of the coals at present is delivered before the time here specified?

No. In the City I found that it was so; there the inconvenience was felt to be so great that they have fallen into the practice without law; we require it to be made law in other places.

58. Lord *Stanley of Alderley.*] Do you think that it is as important to prevent the delivery of coals between these hours in the small streets, where the traffic is not very great, as in the larger ones, where the traffic is considerable?

No; and there is an exception made in this clause: it says, "except between the hours of 1 and 10 o'clock in the morning, or in such back streets, or other bye-ways, as may be approved by the Commissioner of Police." I should think that the Commissioner of Police would exercise such power as that very liberally, where it could be done without inconvenience to the public.

59. The chief object which you have in view in framing a regulation like this, is to prevent a block in the streets and interference with the traffic in the great wayfares of the town?

Not only that, but also to take the conveyances out of the streets during those hours. For instance, take any wharf, say in the Strand, a waggon comes out with coal and goes down the Strand, causing great inconvenience in passing along, although the delivery may be actually at a place where there is no such amount of inconvenience.

60. Would it then meet the objects which you have in view, to enact that the streets should be specified along which the traffic was not to go between certain hours, leaving it open for the traffic to be continued in the small streets where the population was less dense, and the traffic less considerable?

I think that it would be very difficult to specify such streets in an Act of Parliament, because the habits of people and of traffic, change; and it is also supposing that the Commissioner of Police, or whoever is entrusted with the power (which would be a very invidious power to be exercised) would exercise a sufficiently liberal discretion. In effect, it would be to put such places in

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another part of the Bill which is under the head of "Special Limits." If your Lordship will refer to the 12th section, you will see that there is a power to constitute special limits, within which much more stringent regulations can be made. No doubt if the regulations as to the delivery of coals and beer were added to the regulations under the Special Limits Clause, very much of what your Lordship suggests could be done.

61. Would it not be invidious for the Commissioner of Police to define the streets through which this traffic was not to pass, or to except certain streets, which by this Bill he is empowered to do?

The case I think would not arise often; there is a question whether the provision should be so restricted to such back streets and bye-ways, perhaps a wider discretion might be given.

62. Earl *Granville.*] Does it not often happen that streets become, or cease to become great thoroughfares, owing to the opening of other streets, or of a railway station, and would it not be very inconvenient to have to come to Parliament every time that a street became a great thoroughfare?

That is so, and I think that that would be a very strong objection to the suggestion which my Lord Stanley of Alderley has made.

63. Lord *Stanley of Alderley.*] In Clause 6 of the City Bye-laws, which you have said was never carried into effect, it was proposed to schedule particular streets?

Yes; I think I remember that.

64. But you think that it would not be easy to apply such a regulation in this Bill which would remove the greatest objections which you entertain to this heavy traffic, through the streets where there is a considerable amount of traffic?

This was done by bye-laws which might be altered by the Lord Mayor, and certain authorities of the Corporation without going to Parliament.

65. Could not the same provision be introduced into this Bill, by which the matter could be carried into effect by bye-laws made by the Commissioner, and approved by the Secretary of State?

That would be very much the same as what I have stated under special limits; say, for instance, from Charing-cross to the end of Waterloo-place, which is a very crowded part; no doubt a more stringent regulation might be necessary there than in the upper part of Regent-street, or even along Pall-mall. I certainly feel that it is quite open for consideration whether those provisions should not be within the special limits of the Act.

66. And you think that a good way of carrying it into effect would be to require bye-laws to be framed by the Commissioner of Police and the Secretary of State?

Yes; that is very much what is done by the Bill within the special limits. Section 12 is, "The Commissioner of Police of the Metropolis, with the approval of one of Her Majesty's Principal Secretaries of State, and the Commissioner of City Police, with the consent of the Court of Mayor and Aldermen, and subject to the approval of the said Secretary of State, may from time to time direct that any street, or portion of a street, within the limits of the first part of this Act, is to be deemed to be within the special limits of this Act, and may from time to time take any street" (allowing such alterations as your Lordship has suggested) "or portion of a street out of the special limits of this Act; provided," so and so. Then Clause 13 states the nature of the regulations which may be made. If within the special powers to be exercised within special limits, these provisions were put as to the delivery of coals, and of heavy carts, that I apprehend would meet your Lordship's views.

67. Are you of opinion that it would be necessary or desirable to impose the same stringent regulations upon the outer circle of four miles as upon the inner one; for instance, would you think it necessary to establish these regulations in the case of persons residing at Hampstead, and in the outer part of the metropolis?

I think not.

68. Earl of *Kimberley.*] Is it not the case that a considerable proportion of the

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the coal consumed in London is delivered at wharves upon the river, and that you could not allow that coal to be carted in the streets without the obstruction to which you object, so that the carting of it could not take place?

No doubt that is so. Those heavy waggons passing through the streets cause obstruction, and unless by some means a considerable number of vehicles are taken out of the streets during the crowded hours of the day, I believe that the evil cannot be remedied.

69. So that no special exception, as regards the delivery of coals in the streets, would meet the difficulty which exists of there not being sufficient time to bring the coals from the wharves to the places where they are delivered?

Certainly; it would still leave the question to which Lord Stanley of Alderley refers, as to taking waggons to get to those places through crowded streets, so as to cause this great amount of obstruction, and danger, and delay.

70. Lord *Stanley of Alderley*.] You do not think that it would be met by reciting the particular streets in which these regulations were to be enforced, namely, to prevent any of these heavy carriages coming through the Strand, or Fleet-street, or any of those places?

This object might be partly met by another provision which is in the Bill, within the special limits, namely, the first subject matter in Clause 13: "With respect to the route to be taken by all carts, carriages, or other vehicles passing along the streets, with power to prohibit any cart, carriage, or other vehicle from coming into any street or part of a street for the purpose only of passing to its destination." If the wording of that were a little altered, it might still give the power. Although coals were delivered, for instance, in Belgrave-square, you might compel them to go such a way round as to keep them out of the crowded streets.

71. Earl of *Kimberley*.] Have you any means of telling us what quantity of coals is delivered in the course of a year within the radius to which this Bill would apply?

I have not; that information, no doubt, will be given.

72. I gather from your answer to a former question, that you admit that the coals are delivered in the metropolis throughout the day?

Certainly; I understand that within the City they are not; I have heard so.

73. So that, in point of fact, that which is now done during the whole of the working day will have to be done within nine hours, under the present Bill?

It is open to consideration whether the hours might not be a little extended; the clause says "between the hours of 1 and 10 o'clock in the morning." I think it might be an hour longer than that.

74. Earl *Graham*.] In the evening, particularly after 6 o'clock, I should think that there would be no objection?

It might be so; but in the west end of the town the traffic is very great at that time.

75. Lord *Stanley of Alderley*.] Would it not be objectionable that each householder should have to open his premises for the reception of coals in the night-time?

I think that there would be no objection to it; he might leave open the coal-hole in the area. I wish that the areas were better protected.

76. If the coal was delivered in the night, would not those things to which you refer in that observation occur more frequently?

No; I should look upon the coal porter as a sort of policeman. I think that if the coals could be shot through, the door in the area being left open for trimming the coals, there would be no difficulty. With regard to sweeps, they have to go into every room in the house, and that is done at night.

77. Earl *De Grey*.] But the sweeps are admitted to the house by the owner?

Yes.

78. But I understand you that in the case of coals, you propose that the hole into the cellar should be open all night; would not that be liable to a great deal of danger?

That is done now; if the house was properly closed, I do not think that there

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there would be any difficulty, and I do not think the hardship would be excessive in requiring a servant to be up.

79. Earl of *Kimberley*.] Are there not many persons in London who have no servant?

Then I think that they themselves must keep up.

80. Would not it be a very serious inconvenience to the public, that whenever they had to receive coals, either they themselves, or a servant, must remain up for the purpose of admitting them?

It is till 10 o'clock in the morning.

81. Lord *Stanley of Alderley*.] If you concentrated the whole delivery within the hours of daylight in winter, under this Bill, as at present framed, there certainly would hardly be time for the necessary service to be performed?

I am not at all clear that those hours might not be extended; instead of from 1 till 10, it might be from 11 to 11.

82. Earl *Stanhope*.] Have you ever considered the point whether it would be desirable, or possible, to establish a different scale of hours for the six summer, and the six winter months?

It is done for many purposes; but the street traffic is not very different, I think, at any season.

83. In giving advice on this Bill, have you considered the point whether that would be desirable?

I have, and I do not see that there is such a difference in the traffic in the different seasons, as to make it so desirable as it is in many other matters.

84. *Lord Steward*.] With the powers which the Bill gives to make regulations within the special limits, do you consider that this general clause is necessary; is it not the case that within the special limits appointed by the Bill, the Commissioner of Police may make, with the sanction of the Secretary of State, all the necessary regulations both with reference to the route to be taken by the heavy waggons, and the hours, and so on?

Taking Section 5, I apprehend that it would not come within the special limits, and I think that it ought to be in the Bill somewhere; take, for instance, the prohibition of scavengering.

85. We are now upon Clause 6, with regard to the delivery of coals, and casks, and other heavy goods; would not all the powers which obtain in Clause 6 be equally obtained under the clause as to the special limits?

No, for this reason, that you would then allow carts and heavy vehicles to pass through streets not within the special limits, unless you enlarged the special limits to an extent which might be unreasonable.

86. *Chairman*.] And, in addition, you would not meet the evil which you have mentioned, which is caused when these carts are unloaded by persons being driven off the footpath into the road?

Certainly, you must very considerably extend your special limits.

87. *Lord Steward*.] By the streets within the special limits, do you understand a quantity of ground entirely covered over within those limits, or may it be as described in the Bill, "The Commissioner of Police of the Metropolis, with the approval of one of Her Majesty's principal Secretaries of State, and the Commissioner of City Police, with the consent of the Court of Mayor and Aldermen, and subject to the approval of the said Secretary of State, may from time to time, direct that any street, or portion of a street, within the limits of the first part of this Act, is to be deemed to be within the special limits of this Act." Does that render it necessary that all the the streets and area comprised within the special limits, are to be contiguous one to another; that is to say, one solid mass of ground; or may it be that any streets which the Commissioner of Police considers necessary to be included within certain regulations may be so put within those regulations, whether those streets be contiguous to each other or not?

I understand that it is not really necessary that they should be contiguous I should mention, as a fitting instance for special limits, the narrow part of

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Charing-cross, say from the Admiralty up to the part where Cockspur-street becomes wide.

88. Do not the powers which are given for regulation within the special limits really comprise all that is wanted, enabling the Commissioners of Police to describe certain streets, as occasion might arise from time to time, as streets within which certain traffic was to take place, or limitations of traffic were to take place?
Your Lordship now only alludes to vehicles.

89. I only refer to the powers contained in Clause 6. Do not all the powers to be given by Clause 6, really fall within the powers given to the Commissioners under the special limits?
There is a collateral or incidental object, which is not effected by the special limits, namely, the passing through the streets not within the special limits. For instance, take Charing-cross: the waggons, in order to get there must pass through the crowded part of the Strand, they then go into Bridge-street, and so over Westminster Bridge, and that is a part which is very dangerous. Carts and waggons in getting to Charing-cross, would either pass down the Strand, or along Cockspur-street, both of which are very crowded and difficult places for traffic, and they would go along Bridge-street, and Great George-street, and St. Margaret-street, all of which require special provisions.

90. Would it not be quite possible to put those crowded thoroughfares within the special limits, and to apply to them those regulations which were thought necessary?
I think it a question for consideration whether those thoroughfares might not be put within the special limits, while, at the same time, I think that there would be a difficulty in keeping the traffic out of streets leading to those special limits.

91. The special limits clause does not require the traffic to be kept out of those streets, but merely gives the Commissioner power to regulate the traffic coming through those streets?
"With power to prohibit any cart——"

92. It is optional?
Yes; "With power to prohibit any cart, carriage, or other vehicle from coming into any street, or part of a street, for the purpose only of passing to its destination in some other street or part of a street." But certainly, as to Clause 6, it is a question whether it might not be met by giving a special power to deal with those cases, and putting them within the special limits clauses.

93. A noble Lord has asked whether it would not be better in these regulations to name certain streets with a view of preventing unnecessary inconvenience. I think that your answer to that question was, that it would not be convenient to introduce the names of certain streets into an Act of Parliament, in consequence of the various changes which take place, although they might be introduced into a bye-law?
Yes.

94. If the special limits powers applied to the regulation of the traffic of these streets, would not that inconvenience be avoided, and would not the regulations of the Commissioner, from time to time made under the special limits clause, meet all the requirements of the case?
That would be so with the exception of what I call the incidental inconvenience of allowing vehicles to pass through certain streets in order to reach the particular streets; but I think that it is a matter for consideration how far Clause 6 might be embodied in the provisions as to special limits.

95. *Chairman.*] Will you proceed to the next clause?
Clause 7 would remedy a very great evil which now exists; the present law of the 2nd and 3rd Victoria, c. 47, prohibits any goods or collection of articles from being placed upon the footway for the purposes of sale, so that in any case where the articles are not exposed for sale there is no power now to prevent the occupation of the footway to any extent, or, I believe, even the carriage-way; for instance, at Charing-cross there is a great railway van office,

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office, and all day long a considerable number, and more largely in the afternoon, of heavy packages are placed upon the footway there, which is already very narrow, and there is no power to prevent it, because, although the clause says, "except for the purposes of loading or unloading," that is so vague that it is impossible to prevent it. They bring three or four waggons at a time, and some goods are placed out for one waggon, and others for another, so that in fact the footway is to a considerable degree covered with heavy packages all day long. The object of this clause is to extend the provision, with regard to goods being exposed for sale, to their being exposed for any purpose.

96. Lord *Stanley of Alderley*.] Must not the goods remain for a short time upon the footway preparatory to the loading of them?

No, I should say not; they should be carried direct from the office to the waggon, and not be put upon the footway at all.

97. Lord *Methuen*.] There is great inconvenience in Piccadilly, I think, from that cause?

Yes, and at the corner of Jermyn-street, and also in Oxford-street, where a great part of the footway is all day long covered with heavy articles.

98. *Chairman*.] Do you consider that this clause would cover articles in casks which were not intended to be sent into cellars, namely, articles of a different description from beer, which might be taken from vehicles into shops in the same manner as boxes or things of that description are taken?

It would admit of their being carried across. The proposed provision is, that no goods shall be allowed to rest upon any footway.

99. Lord *Stanley of Alderley*.] To what sort of cases does the 3rd section of the 7th clause apply? It says, "For the purposes of this Act the surface of any space that intervenes in any street within the limits of the first part of this Act, between the footway and the carriage way, shall, notwithstanding any claim of any person, by prescription or otherwise, to the deposit or exposure for sale of any goods or other articles on such surface, be deemed to be part of the footway."

One place where your Lordship may have witnessed that is, along the New Brompton-road, some few years ago, at the time of the late Exhibition, by subscriptions and by an arrangement, the footpath was largely increased there, the people yielding their rights, if they had them; but some few refused, and it now appears that a very great nuisance exists. There is the footpath close to the shops, and there is a considerable space where a market is carried on in fish and vegetables, and various things, with coverings over them, and then there is the roadway. Likewise in the Commercial-road it is so to a very great extent; there is a space where the magistrates have always refused to deal with the case, saying that there was a question as to the right of property, But, inasmuch as it is so far devoted to the public use, the object of this clause is to say that it shall be totally devoted to the public use, and that you shall not expose your goods there.

100. Earl of *Tankerville*.] Would that clause apply to the market which is held in Oxford-street on the Saturday evening?

That market, I believe, is really illegal, and might be stopped, but it has existed for a number of years, long before the establishment of the police; and inasmuch as there is a very great difference of opinion among the shopkeepers there, some thinking it a benefit, and some not, the view which I took, with the approval of the Secretary of State, was, that the police should not interfere unless the inhabitants were unanimous in calling for its removal.

101. There is another market, by the Lock Hospital, in the Harrow-road?

Yes; and also in the New-cut, Lambeth, and in the Tottenham Court-road, and in many places.

102. Lord *Stanley of Alderley*.] Do you think that this clause would enable you to abolish those markets where they exist?

This clause would not apply, but I believe that now they might be abolished. It would apply to a part of the New-cut; that part where there is a flagged footway, and then an open space, and then the carriage-road.

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103. In point of fact, many of those places can hardly be considered as footways; for instance, at Brompton, passengers do not walk upon the part where those stalls exist; the footpath is between those stalls and the houses?

Yes; but there is a very great inconvenience from persons standing buying there; the inconvenience is so great that it would seem to be reasonable that persons who have so far devoted that portion to public passage, should not be allowed to obstruct it.

104. Earl of *Airlie.*] Did those people who gave up their rights along the Brompton-road, receive anything in the way of compensation?

I am not quite aware, but I believe that some did.

105. Earl *Graham.*] Have the parties a legal right to be there more than in the other places which you have mentioned?

There is a doubt about it; the magistrates have declined to convict; and have said, "You can bring an action against them;" I have thought that is not the business of the police, so far as I regard it.

106. Lord *Stanley of Alderley.*] Has the right ever been tried?

Parties have been summoned before the magistrates, and the magistrates have said, "As there is a claim of right we decline to convict."

107. Was it claimed as a prescriptive right?

They claimed it, I believe, as having been originally their property, and the magistrates said, "Indict them for a nuisance." That is a very onerous process, as well as an expensive one.

108. There has not been any decision upon that point?

No, certainly none establishing the rght.

109. *Chairman.*] With regard to Section 8, will you explain to the Committee in what respect that section modifies the existing law?

The existing law which is the "Metropolitan Cattle Market Act, 1857," enables the Metropolitan Commissioner of Police with the consent of the Secretary of State, and the Police Commissioner for the City of London, I believe with the consent, or at all events to some degree under the authority of the Lord Mayor and Aldermen, to make regulations as to the hours and routes within and by which cattle shall be driven. Regulations were made by the Commissioner of Police, namely myself, with the approbation of the Secretary of State, within the Metropolitan District; but within the City no regulations have been made, I believe, to this day; I had several communications with the late solicitor for the City, Mr. Pearson, who told me that in fact the local interests were so strong that they could not make a bye-law regulation, and no regulation has been made. This eighth clause would be an absolute prohibition except with the license of the Commissioner of Police; in short the law would prohibit, and the Commissioner of Police might license an exception to that law.

110. In fact, at present, the Commissioner of Police makes the law, but in this case the Act makes the law, and the Commissioner of Police may dispense with it?

Yes.

111. Earl *Graham.*] Are not the hours specified at present within which cattle may go?

Yes.

112. *Chairman.*] Is it not the case that although these are the hours, you have stated that you will not interfere until 12 o'clock?

Yes, except there is an absolute stoppage or obstruction. There are frequent cases in which parties are summoned. As regards the City, cattle come to the limits of the City, and I have no power to stop them; the metropolitan police have no power to stop them; it is an offence, nevertheless, and a cause of great nuisance and obstruction.

113. The limits of the City are very badly defined, are they not?

Yes. In fact, except on the river, which I can hardly call a limit for this purpose, the metropolitan police have no jurisdiction in the City; they have jurisdiction upon the river; the Thames police is under their jurisdiction.

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114. Earl *Graham.*] I have seen cattle at Hyde Park, Corner in Piccadilly—I cannot state whether it was past 12 o'clock or not; but I have seen them going along Piccadilly very lately.

Yes, if they go along after 12 o'clock, the drivers are liable to be summoned, and they frequently are so.

115. Lord *Stanley of Alderley.*] Does the practice exist, to a very great extent, of moving cattle without permission?

Not very greatly. Communications were made to all the cattle salesmen, and they promised, more especially if tolerance was given till 12 o'clock, that they would be very careful that their drivers, so far as they could effect it, should not violate the regulation.

116. Earl of *Tankerville.*] You would not, I presume, think it necessary to enforce this provision in the outer limits; in the neighbourhood of Islington, for instance?

The present law is a little inconvenient; for instance, Kensington is not put down; it is confined to the metropolitan boroughs, the City of Westminster, and the City of London; the limit is very vague and varying, and people, with the exception of those whose business it is, do not know where the boundaries are.

117. Lord *Stanley of Alderley.*] But you contemplate giving a license in cases where it would not be very inconvenient?

I think that ought to be done. Under the Orders in Council, no cattle can now be moved in any part of the metropolis without a license from myself, but arrangements are made, so that I believe that no practical inconvenience whatsoever arises.

118. Earl *Granville.*] Did the regulations as to the cattle traffic lead the traffic in any sensible degree?

I think that they did in some degree.

119. Lord *Stanley of Alderley.*] Clause 8 would not apply to sheep, would it?

There is an interpretation clause, namely, Section 4, which enacts "The word 'cattle,' in addition to neat cattle of every description, shall include sheep, goats, and swine, also horses, mules, and asses, when led in a string, or loose."

120. *Chairman.*] What is meant by "led in a string," is tying the head of one animal to the tail of another, and not leading them by a halter?

Yes, which is very objectionable.

121. Will you refer to Section 9?

That section will stop and prohibit what is now a very great nuisance.

122. Lord *Houghton.*] Will it not interfere with the building trade?

I think not; I think that that is law now as to the carrying of timber, iron, and metal within the City.

123. Lord *Methuen.*] Is not eight feet six inches too wide, considering the width of the street?

I do not think that it is too wide; that I believe is taken from the bye-law of the City, No. 3; this is now law within the City. That bye-law is, "No person shall drive any cart, waggon, or other vehicle, wholly or partially laden with timber, scaffolding, or other poles, logs of wood, or other articles or things, whether consisting of wood, metal, or other material, exceeding 25 feet in length, or eight feet six inches in breadth, through any street, between the hours of nine in the morning and six in the evening"; that was taken, I believe, as being the ordinary width of the present vehicles used for this purpose.

124. Lord *Stanley of Alderley.*] Would not this provision, which prohibits the carrying of any scaffolding, poles, or ladders, or anything of that sort, interfere materially with building in the outskirts, where a great number of new buildings are being erected, and where the population is not very dense.

It says, "exceeding 25 feet in length."

125. Many scaffolding poles exceed that length?

Then I should say that they must not take them between those hours. It is a partial inconvenience for the general good.

126. Is there much inconvenience in the outskirts of the town where the population is not dense, and where a great deal of building is going on. Would you think it necessary that the prohibition should apply there as well as in the centre of the town?

They must get to those places.

127. *Lord Steward.*] That is discretionary with the Commissioner of Police, is it not?

Yes; his license might be given in any particular place.

128. Lord *Stanley of Alderley.*] Though it may be a very proper regulation to enforce in the densely-peopled part of the town, do you think that it is necessary to enforce it in the outskirts?

That would, I think, be easily remedied by a license. I do not believe that any police law can be so defined that there must not be a considerable discretionary power left with whoever is to administer it. I think that it must either be so large as to admit of the continuance of the nuisance, or so stringent as to cause very great hardship. A discretionary power, I admit, is objectionable if you can do without it; but I do not think that you can, and at present the discretionary powers of the Commissioner are very considerable; and I submit that they must be so.

129. In the case of one of the petitioners before this Committee, namely, the Surrey Dock Company, they complain that it would very much interfere with their trade if they were prohibited from taking any of their timber from their docks to different parts of the town, except within the limited hours. Do you think that it would be necessary to enforce the prohibition in those cases if the articles did not go into a crowded part of the town.

I apprehend that that must be left to be met by special license if there was any special grievance of that sort. Paragraphs 2 and 3 of Clause 9 are of the same nature, paragraph 3 prohibiting more than four horses; that I think seems to be reasonable. Section 10 is as to the taking up or setting down of passengers by omnibuses on the proper side of the road; that, I believe, would be a great convenience.

130. Would it in all cases be a convenience to compel an omnibus to pull up on the side of the street in order to set down a passenger?

I believe that there would be less obstruction; if you were set down in the middle of the street you might not be able to pass on one side or the other; the section says, "as near as may be." If there were any carriages in the way the omnibus could not go quite to the side.

131. *Chairman.*] Would it not be a great convenience for passengers to be put down near the pavement?

A very great convenience, particularly in the case of female passengers.

132. Lord *Stanley of Alderley.*] Would not the omnibus cut across other carriages?

It would not cut across the street, because it would set down on its proper side, namely, the left-hand side; so that the carriage would merely draw in a little.

133. Would it not interfere less with the traffic if the omnibus kept a straight and direct road, and did not diverge to set down passengers?

I think not, because it frequently obstructs the whole street if you stop in the line in which you are, whereas if you draw a little to the side you let other carriages pass; in fact, I believe that it is done now to a very considerable extent, namely, drawing up to the proper side; but where there are rival omnibuses they purposely stop a little ahead of one another to prevent their passing, and cause a great obstruction in that way.

134. *Lord Steward.*] Do you not think that it might be a frequent cause of accident if the passengers were put down in the middle of the street, and had to make a rush to a point while a rival omnibus was trying to get beyond the other?

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I think that I could produce many cases of accident occasioned in that way; by a carriage going at a rapid rate; I believe that several accidents have been caused in that manner, and certainly a great deal of alarm.

135. *Chairman.*] Do you not think it likely that if this clause were made law the omnibus drivers would of their own accord take a straight line nearer to the pavement than they do at present.

I think that they would very soon reconcile themselves to what was found to be a general convenience. Section 11 merely extends the provisions of the present law; the present law absolutely prohibits any placard or advertisement of this nature from being carried upon the footway; but it does not prohibit its being done upon the carriage-way, unless it causes inconvenience or annoyance to passengers.

136. Lord *Houghton.*] Did you not prohibit it yourself lately?

A notice was given that when those men did it proceedings would be taken, not against them, but against the persons sending them out.

137. But what is your objection to those men?

That they cause a great obstruction.

138. Lord *Stanley of Alderley.*] Was not there a provision in a former Act stopping those large advertisements?

It is absolutely prohibited upon the footway.

139. There used to be some drawn by carriages?

Yes; I have seen 16 or 17 going one after another. By the present law it is absolutely prohibited upon the footway. It is prohibited by the Act to which your Lordship refers, namely, the 16th and 17th of Victoria, c. 33, with a restriction, which, like many of these restrictions, makes the Act very unworkable.

140. *Lord Steward.*] Would you, by Clause 11, prohibit the distribution of handbills in the street, under the words "carried or distributed in any street?"

Yes; I think it is a great nuisance in a crowded street, having people putting papers in your hand. The present law is this: by the 16 and 17th Victoria, chap. 33, sec. 16, it is provided that "It shall not be lawful for any person to carry about on any carriage, or on horseback or on foot, in any thoroughfare or public place within the limits of this Act, to the obstruction or annoyance of the inhabitants or passengers," and so on. No inhabitants or passengers can be got to give evidence. The magistrates say "You must produce an inhabitant or a passenger;" but such persons say, "My time is too important for me to go before a magistrate." This would have the effect of prohibiting it absolutely.

141. Lord *Stanley of Alderley.*] Practically those large advertisement vans are stopped, are they not?

Yes; because they caused such annoyance; the carrying of boards is absolutely prohibited upon footways.

142. The "sandwiches" are driven into the gutters?

Yes, now they are, because a stricter eye is kept upon them. I am told that horses are continually frightened by them.

143. Earl *Granville.*] With regard to clauses 12 and 13, is the Commissioner of City Police under the jurisdiction of the Home Secretary in any matters excepting those that are referred to in this Bill?

Yes; by the City Police Act first of all he is appointed subject to the approbation of the Secretary of State. Colonel Fraser will be able to tell more particularly, but I believe that certain powers which he exercises must be exercised with the approbation of the Secretary of State.

144. Is it in your opinion a convenient arrangement that with regard to these traffic orders he should be under the superintendence of two distinct bodies?

I think it is very inconvenient; I think the double authority is open to very great objection. The Commissioner of Police within the City limits, and subject to the Secretary of State's authority, ought to be placed in just the same position as myself.

145. Lord

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145. Lord *Stanley of Alderley*.] Is he not so by Clause 13: "The Commissioner of Police of the Metropolis, with the approval of the said Secretary of State; and the Commissioner of City Police, with the consent of the Court of Mayor and Aldermen, and subject to the approval of the said Secretary of State," and so on.

Yes, but there is the consent of the Lord Mayor and Aldermen required. I should desire, of course, not to suppose that anything would be done that ought not to be done, or left undone that ought to be done; but it is in fact leaving it to persons who themselves might have an interest not to make restrictions upon themselves.

146. Earl *Granville*.] Your opinion is decidedly against the clause as it now stands?

Decidedly, so far as the consent of the Lord Mayor and Aldermen is concerned.

147. Lord *Stanley of Alderley*.] You would propose that the Commissioner of Police in the City should be in precisely the same position as the Commissioner of Police in the metropolis?

Precisely; and there would be this great incidental convenience: the Commissioners of the Metropolitan and City Police might meet together and consult and make arrangements much more conveniently than if it had to be done with the consent of so large a body (and that body with, perhaps, varying opinions) as the Court of Mayor and Aldermen.

148. Lord *Houghton*.] Are not those words a mere form, and would not their consent always be given to their own officer?

I would rather that the Committee took that from Colonel Fraser; I believe you would find that they would not be a mere form.

149. Lord *Stanley of Alderley*.] Is there any case in which the City Commissioner exercises powers for which the consent of the Lord Mayor and Aldermen is not required?

I am not quite aware; the City Police Commissioner will be able to explain that better than I can. I think there are various powers which he exercises without their consent; all the incidental powers for enforcing the law are exercised without any consent on the part of the Lord Mayor and Aldermen.

150. Earl *Stanhope*.] In Clause 14, does not the word "wilfully," which is there introduced, tend rather to defeat the action of the Bill, because how can you prove that a man disregards the Act wilfully; you can only prove the actual offence, not the wilfulness of it?

Perhaps the disregarding of the Act might be a mere oversight.

151. How would you attempt to prove that a disregard of the regulations was wilful, and what other proof could you have than that of its being a disregard in itself?

In some cases actual warning might be given, either by notice or by the constable at the place, to the driver of a carriage, and if he said, "I will drive on in spite of you," that would be a wilful disregard.

152. *Chairman*.] This clause is what is commonly called a slang clause, is it not, which is put into all Acts of Parliament?

Yes, I believe so. At the end of Bridge-street, where I exercise an authority which I believe the law would hardly support me in, by keeping constables there to stop the traffic, without which it would be impossible to pass safely, in the course of last summer a gentleman, who refused to comply with the arrangements, drove over a constable and injured him for life. He was indicted for that as an assault, it being so serious, and he was convicted, and paid, I think, 150 *l.* compensation for the constable.

153. Passing to Clause 17, which is entitled, "Regulations as to Hackney Carriages," have you anything to say on that clause?

The present law on that subject is contained in the 16 and 17 Vict. c. 33. The present law gives 6 *d.* for any fare not exceeding a mile. The proposal is for the first mile to make it 1 *s.*, so that no driver should be required to go any distance for less than 1 *s.*, and the proposal is that after that the fares should remain as at present.

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154. Lord *Stanley of Alderley.*] How far is it proposed a driver should be required to go for 1 *s.*?

Two miles.

155. And for every mile after that, 6 *d.*?

Yes.

156. Lord *Houghton.*] Will you have the goodness to state whether you think that there is any sufficient discontent with the present system to justify altering Mr. FitzRoy's Act in this particular?

The present law is to a very considerable extent a dead letter; but, at the same time, in many cases it is enforced, and I think very harshly. I have known cases of persons who habitually walk a certain number of yards to bring a cab within a few yards of a mile, and then force the driver to drive a mile, taking him off his stand merely for 6 *d.*

157. Do not you believe that that case is a very rare exception?

No. I have numbers of letters complaining of cabmen for not being content with 6 *d.*

158. Do not you think that there is at least something to be said on the other side, namely, that the cabmen will lose, by losing altogether that portion of the population which can only afford to pay the 6 *d.*?

One answer to that is, that it does not prevent the cabman taking 6 *d.* if he pleases; if he chooses to take 6 *d.* he may do so, and I daresay very often bargains would be made, as is the case now.

159. *Lord Steward.*] Is not it the case that, if 1 *s.* was the legal fare, they would often take it grumblingly, whereas now, when 6 *d.* is the legal fare, if you give them 1 *s.* you are always treated with civility?

That is one view of the question, but I think that the 1 *s.* is an amount that they would be content with.

160. When 1 *s.* became the legal fare, would not they probably receive it with as much grumbling as 6 *d.* now?

No; I think that the 6 *d.* difference is substantial, and would be felt to be so.

161. Earl *Granville.*] Do not you suppose that there are a very large class of persons in London who are, perhaps, somewhat infirm, and go to their club, a short distance, every day, and would it not make a very great difference to them paying that 1 *s.* every day of the year?

The 1 *s.* is also conceived to be necessary with a view to getting cabs of a better description than now.

162. Lord *Stanley of Alderley.*] Are you aware whether there is any fare as low as 6 *d.* in any other town in England?

None that I know of; I should not think there is. The London cabs are, I believe, the cheapest in England.

163. Lord *Houghton.*] Do not you think that the present London cab, with its little stuffing and its clean wooden sides is altogether one sufficiently comfortable for purposes of transit, and sufficiently safe from the danger of infection?

I think it is very desirable to have a better class of cab; I do not mean a very superior class.

164. Lord *Methuen.*] From your knowledge of the characters of cabmen, do you think that if you were to increase their fares they would expend the money in improving their cabs, and getting better horses, or that they would spend it in drink?

I think that a more stringent regulation as to cabs might be applied; as for instance, under the following sections, there are considerable powers given to take, off a stand, cabs not in a fit state, either as to the cabs themselves or as to the horses; and I think that those powers might be applied in a much more effective manner if by the advance of fares the cabs might be expected to be better. It is nevertheless true (I ought to mention it here) that the number of cabs has increased very much of late years; in fact, it has nearly doubled.

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165. Earl *De Grey.*] Have you any reason to suppose that cabs have got worse since the passing of Mr. FitzRoy's Act?

No, I am sure they have not.

166. *Chairman.*] Did not the Commissioners of Inland Revenue in their last report express a different opinion?

That is very recently; I think within the last three or four years they have deteriorated; I must say, and I do so unwillingly, that I think it has been partly from insufficient supervision over them.

167. Earl *De Grey.*] Since Mr. FitzRoy's Act passed do you think they have improved?

I think they have.

168. Lord *Stanley of Alderley.*] Has not the present rate of fares with the advantage which is got by having a better description of cab, been a sufficient inducement to a large number of Hansoms, which have much better horses and are a more expensive class of carriage, to come upon the stands?

Yes, but practically that works as a striking illustration, I should say, of the higher fares required by a superior class of cabs; for almost everybody pays more for a Hansom than for a four-wheel.

169. That is an instance showing that where there is a better class of cab, people choose it by preference, and are even willing to give a larger fare for it?

Yes.

170. *Chairman.*] One of the reasons, I think, for the proposed increase from 6 *d.* to 1 *s.*, is that by the second paragraph of this section it is proposed to compel every driver of a hackney carriage to carry a lamp at night?

Yes; they will be put to greater expense.

171. Earl of *Lucan.*] Do not you recollect that at the time of the passing of Mr. Fitzroy's Act, the great objection which the cab interest had to that Act was the 6 *d.* fare?

No, I beg your Lordship's pardon; it was not altogether that, I think; it partly had reference to their going certain distances into the country; and accordingly by a subsequent Act, the 127th chapter of the same Session, the fares beyond the four mile radius were increased to 1 *s.* a mile.

172. Do not you recollect that there was a general expression of feeling on the part of the cab interest, that if the 6 *d.* fare was given up they would be reconciled to the Bill?

Yes, I believe there was, but the sixpenny fare was not given up, and an alteration was made to this effect in chapter 127 of the same year, "A shilling a mile to be paid for every mile beyond the circumference of a circle four miles from Charing Cross if the carriage shall be discharged beyond such circumference." The great grievance alleged then was, that they might drive six miles out in the country and get no back fare, or any chance of a fare, people not being about who would be likely to hire them.

173. Lord *Houghton.*] Has there been a sufficient amount of accidents or inconveniences to authorise us to require the lighting of cabs at night?

Yes, I think it a very important provision; the Hansom cabs almost all do carry lights, and I think it would be a very great security; a cab comes quietly along without any light, and it is hardly visible, and I think many accidents happen when a light would enable people to get out of the way.

174. Have you ever thought of the arrangement of giving the cabman 6 *d.* for half a mile so as to secure the short distances?

The great difficulty in fares for distances consists in ascertaining the distance; and if you come to half miles, it is very difficult to ascertain when you have gone half a mile. I should have been glad if it had been practicable, but it does not seem to be so, to make the regulations by time rather than by distance.

175. Are you convinced that there is a sufficient demand for this alteration of the law?

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It is with that view I wish it done. I believe it would improve the class of cabs generally; and as to the light, I think it would be one item of additional security at night in the streets.

176. Earl *Granville*.] Paragraph No. 2 of Clause 17 is not exactly for the convenience of persons using the cabs; it is for the general advantage of the traffic in London. Is there any particular reason why there should be an Act of Parliament obliging a hackney carriage to have a lamp, and not obliging every carriage to have one?

First of all, you can control the one, while you cannot control the other.

177. Are you aware that it is a regulation common to all capitals except our own, that all carriages should exhibit a light?

I believe so.

178. Lord *Stanley of Alderley*.] Have many accidents occurred in consequence of cabs not carrying lights?

I believe so; they make very little noise, and they are often upon you before you are aware of them.

179. Earl of *Kimberley*.] Under the present law an additional 6 *d.* is payable where more than a certain number of persons are carried; under this Bill, will that 6 *d.* be payable over and above the 1 *s.*, or will it be included in the 1 *s.* for the mile?

I believe the construction would be, that the additional 6 *d.* for the additional person would be still payable; that where it is payable for the 6 *d.* fare it would be still payable for the 1 *s.* fare.

180. Suppose the case of a family of four or five, returning from church, and a heavy shower of rain comes on; they take a cab for perhaps 100 yards; at present the fare amounts to a very considerable sum; but if there is to be 1 *s.*, as the basis of the whole fare, and then the other 6 *d.* is to be added, it would become rather oppressive, would it not?

Yes, and it could be easily provided, that for distances not exceeding a mile, the additional 6 *d.* should not be charged for more than two persons.

181. Earl *Granville*.] Are the present regulations as to luggage considered perfectly satisfactory?

I do not find that much inconvenience is felt with respect to luggage.

182. Lord *Methuen*.] Is not it the fact that two people travelling in a cab can take whatever luggage they like without paying for it?

They may.

183. Two people going with any amount of luggage upon the roof, can go to the Great Western Station, or any other station, without paying 6 *d.* for it?

That is the law.

184. In fact three people, one on the box and two inside, can take any amount of luggage they please without paying for it?

Yes, but it is only a reasonable amount they may take.

185. They may take any amount, may they not?

Practically perhaps, but this law was made after a great deal of discussion, and I believe it was the first time that any charge was allowed for luggage; before that you might carry any number of persons inside, and put any amount of luggage outside.

186. Lord *Methuen*.] Who decides what is a reasonable amount of luggage?

That would be a question for the magistrate.

187. Earl *De Grey*.] Is your reason for wishing to have the enactment in paragraph 1, that you desire to have the means of making up to the proprietors for the restriction you put upon them in paragraph 2?

Not altogether; I think that a 1 *s.* fare would produce a higher amount of pay generally, so many fares being under a mile, and therefore ought to tend to produce a better class of cab even in the lowest class. I may state, that in

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1855, when Mr. FitzRoy's Bill passed, the number of cabs was 3,296, and there are now 6,149. The omnibuses on the other hand have decreased; there were 1,446 then, and there are 1,050 now.

188. Lord *Stanley of Alderley*.] Are you able to state whether there has been a diminution in the number of omnibuses and hackney carriages upon the line of road which is served by the Metropolitan Railway?

I cannot at this moment, but I had a return a year ago, which certainly showed a diminution, especially in omnibuses, both between Paddington and the City, and also upon the Crystal Palace side towards Streatham and those parts.

189. *Chairman*.] Paragraphs 3 and 4, I believe, upon consideration, you think hardly necessary?

I think they are not; I think they might safely be omitted. Then I think the 5th paragraph might be strengthened in this way, "The Commissioner of Police of the Metropolis, may from time to time cause to be affixed such plate or mark in such position as he thinks expedient, to any hackney carriage certified by him to be in a fit condition for public use, and may remove such plate or mark whenever such carriage has been determined by him to be in a condition unfit for public use, and the Commissioner may cause any carriage plying or standing for hire, not having such plate so affixed to it, to be forthwith removed."

190. Have you no power of that sort now?

There is a power, but it is rather a difficult one, to bring into practical operation. In the 2nd clause of the 16th & 17th Victoria, c. 33, there is this provision; after directing the inspection of carriages, it says, "If any carriage is not found to be in a fit state, the Commissioners shall give notice in writing to the proprietors thereof; and if, after such notice, any proprietor shall use or let to hire such carriage as a metropolitan stage or hackney carriage, or use or let to hire such horse or horses whilst in a condition unfit for public use, the said Commissioners shall have power to suspend, for such a time as they may deem proper, the license of the proprietor of such carriage, and to recall and take away the Stamp Office plate," so that there is a very summary and a very strong power, in fact, one which I have never used; but in the meantime, after the notice has been given, and before you can get the case before a magistrate, the carriage is used in a very unfit state, and the horse also may be in a very unfit state; so that I think a summary power of this kind would be only making practical the 2nd section of the 16th & 17th Victoria, c. 33.

191. Earl *De Grey*.] By this paragraph it is provided, "that the Commissioner of Police of the Metropolis may from time to time cause to be affixed such plate or mark, in such position as he thinks expedient, to any hackney carriage certified by him to be in a fit condition for public use;" do you certify carriages now?

Yes; no license can be given now without the certificate of the Commissioner of Police that the carriage is in a fit state; but, as I stated in my evidence before the Committee of the House of Commons last year, the law is evaded in this way: the proprietor brings a carriage in a fit state; that is inspected, and a certificate is given, but he puts that carriage aside and uses a bad one; so that the object of this clause as to affixing a plate upon it is to make an external sign that that carriage has been examined and certified to be fit for use.

192. In fact, at present there are no means of proving the identity of the carriage that has been examined?

None.

193. Lord *Stanley of Alderley*.] Is the driver, when he obtains a license, required to produce a certificate of his respectability?

Yes; I have the details here, and they are very adequate, I think.

194. You are satisfied, before a driver is licensed, that he is a respectable character?

Certainly; careful inquiry is made.

195. Earl *Stanhope*.] Is a driver required to pay a fee for his license?

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Five shillings for the stamp; the licenses producing between 3,000 *l.* and 4,000 *l.* a year.

196. Lord *Stanley of Alderley.*] To whom does that 3,000 *l.* or 4,000 *l.* a year go?

It is paid to the Inland Revenue.

197. Earl *Stanhope.*] Has he to pay that 5 *s.* at each renewal of his license?

Yes; the license continues for a year, and each year he has to pay 5 *s.* for the stamp duty. The number of cabs licensed is very considerable; the number of hackney-carriage drivers licensed at this moment is 9,502; the number of metropolitan stage carriage drivers is 1,711, and the number of conductors 1,992; the total number of drivers and conductors who are licensed being 13,200.

198. Is the license to the vehicle or to the driver; if the driver is changed in the course of the year, must there be a new license?

The licensed driver is qualified to be employed if anybody chooses to employ him; he commits an offence if he drives without a license; that license is shown by the badge which he wears.

199. Earl *Granville.*] Paragraph 1 of Clause 17 being intended for the relief of the cabman, have you considered at all another mode of relieving him, namely, allowing him to charge higher within certain hours of the night?

That was considered a good deal.

200. *Chairman.*] That is the case in Dublin, is it not?

Yes, and in Manchester; but it is very difficult to manage, and raises continual questions. At the time the Act was passed, the men said, "In point of fact we put an inferior horse and carriage on the stand at night, so that it pays us very well;" and I have never heard any complaints from them on that score.

201. Your attention has been drawn to the amendments proposed to be inserted in this Bill?

Yes, the proposed amendments, I think, would effect the object. The only place in England where any such attempt has been made that I know of is Manchester; but I understand that, practically, it has only applied to licenses for a number of persons to be carried, and to one class of carriage. The tenor of the bye-law of the Corporation of Manchester is, that any person upon applying for a license to keep a hackney carriage shall state what fare he wishes to run it at. It is then approved by the council who give the license, and he is required to paint the fare upon his doors, so that it should be known what fares he will take people for.

202. Do you think that a provision of that nature might be usefully applied to London?

I think it might.

203. Lord *Stanley of Alderley.*] Have you had any application from people connected with hackney carriages for a measure of this description?

Yes, several; the other day, a person intending to put carriages upon a standing showed me an extremely nice Hansom cab; he subsequently showed me a very nice four-wheeled cab, which was six inches wider in the seat part than the ordinary cabs, and eight inches less between the points of the axle; the body of the carriage was entirely over the springs instead of being as at present within the springs, so that you had more room inside the carriage and less width between the wheels, which is a great object in the streets. He said, "I will undertake to put a number of those cabs upon the streets if I am allowed to charge higher fares."

204. Earl *Stanhope.*] In all the previous Acts regulating hackney carriages the rate of fares is absolutely fixed, whereas in this clause the fares of this superior class of cabs is to be fixed at the discretion of the parties named: would not it be more consistent with previous legislation, and be also the preferable course to have the fares stated in the Act of Parliament?

There would be great difficulty in stating them.

205. Will you explain the difficulty?

The difficulty would be that if you put upon the authority to state what fare a carriage must be hired at, he might fix a fare which he then thought reasonable;

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able; but the proprietor might say, "I do not choose to run my carriage for that fare," so that you would not attain your object of getting a superior class of vehicle.

206. Are you aware that the system of which I am speaking is in force at Paris?

It may be so; the fares of the *voitures* and *remises*, I believe, are regulated by the Prefêt.

207. Both being on the same footing, but under this Act they would not be on the same footing?

No, because in the one case you would say that a cab not complying with such-and-such qualifications shall not be allowed to run; while in the other case you want to induce people to introduce a higher class of cab, and the people who proposed to introduce that higher class of cab would be the best judges of what would repay them.

208. Earl *Granville.*] By the proposed amendment the fares can only be charged on being certified by the Commissioner. If you let the proprietor judge for himself what the public would pay for this superior accommodation, or in what manner he could secure another class of the public by providing a better vehicle at a higher fare, as long as he had the fares affixed to the vehicle, and not changed from day to day, would not that be preferable to any arrangement which the Commissioner of Police might make?

I think it would lead to great inconvenience, if you allowed every carriage proprietor to put upon his carriage what rate of fares he pleased; the fares would be very difficult to be distinguished, especially at night, and there would be continual squabbles.

209. It is proposed to compel those carriages to have lights; might not the fares be painted on the glass, against one side of the light, so as to be visible in the night time, while the fares might be painted in figures on the door, large enough for anyone to see in the day time?

I do not know how that could be managed. I think practically it would be very difficult, looking at the large class of people who use cabs, who are very often unintelligent people; it would give rise to great disputes.

210. Is not what I have suggested done by omnibuses; do not some run at 3 *d.* and some at 4 *d.*?

Yes; but they are required to put up their fares on the omnibus; they cannot recover them unless they do so.

211. Why should not the same regulation apply to cabs?

In the case of omnibuses, in which so many people are together, they have greater influence with the omnibus-man than in the case of a cab, where the individual is very much at the mercy of the cabman; but even in the case of omnibuses there are often disputes.

212. Lord *Stanley of Alderley.*] Do you think the necessity of having a superior description of carriages, exposed to the air, would be likely to operate against the introduction of a better description of carriages, and that that might be obviated by having sheds in which the carriages might stand?

That would be very desirable, if it could be done; that is what is done in Paris, but I do not see how it could be done in our streets, which are so very narrow. In Paris the carriages stand in *porte-cochères,* where there is plenty of room.

213. You do not think it would be possible to have a shed over a stand in the middle of the street?

I am afraid not.

214. Do you think that the absence of that protection to the carriages would be likely to prevent people going to the expense of introducing that superior class of vehicle?

That is a question I asked one or two people likely to know, and they thought that the power to charge 6 *d.* a mile above the fare charged by the ordinary cabs, and, instead of charging 2 *s.* an hour, being allowed to charge 2 *s.* 6 *d.*, would be a sufficient inducement to persons to introduce such vehicles. You

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may get a very good Brougham for 3*s.* an hour from a livery-stable keeper; but there are no regulations applying to such vehicles at railway stations, so that parties hiring them have either to make a bargain beforehand, or, at the end, run the risk of a squabble. I think it is, at all events, well worth trying, whether such a rate of fare would not be the means of introducing a better class of vehicle. Supposing 20 or 30, or 50 persons were willing to put such cabs upon a stand at a certain rate, it would be worth trying; it would only be a dead letter if they did not avail themselves of the opportunity afforded them.

215. Earl *Granville.*] Is there anything in the present law tending to prevent open carriages on four wheels plying for hire as hackney carriages?

None whatever; I believe it is our climate more than anything else that prevents the introduction of such carriages?

216. Is there anything in the present law which has a tendency to cause our Hansoms to be certainly inferior to the Hansoms of the great midland towns?

No; I take it it is the limitation of fare only. Certainly in every part of the Continent where I have been the cabs are much more expensive.

217. Lord *Stanley of Alderley.*] In your opinion is not an interference with the traffic in many parts of the town very largely created by the crawling cabs that go about plying for fares?

I do not know any question upon which opinions are so divided; many people declare that they are the greatest convenience, and ought not to be put an end to by any regulations, while at the same time it is undoubtedly illegal; but sometimes the magistrates will not convict. I know of one magistrate before whom a great many were summoned, and he fined them one penny each. It is rather difficult to prove that a cab is loitering, because an empty cab may be going to its standing, or going home; I certainly wish that the law were repealed, or that public opinion would allow one to enforce it. Within the last three months there have been a great number of cabmen summoned for crawling. A great many are summoned, but the penalties are very small, and in fact so many people will use those crawling cabs that the law is almost inoperative.

218. Lord *Stanley of Alderley.*] Would not it be possible to establish stands in some of the streets running off the main artery of Fleet-street and the Strand.

I have a battle to fight when I appoint a standing. Everybody likes a stand, but not near his own door; people like a cabstand convenient to themselves, but not so as to annoy them. I have here a statement of the number of hackney carriage standings. There are 250 standings upon which 2,471 carriages can be accommodated. But a standing being appointed only permits the drivers to ply there, it does not compel them. I should suggest, if the law were to be enforced against crawling cabs, that the persons who hired them should be subject to penalty likewise; then we might stop it. I should say that the objections to it preponderate over the conveniences; but I believe that the public voice would be against me, especially those people in all classes who, on being suddenly caught in a shower, would hail a cab that happened to be passing. Wherever there is any demand by people in a particular neighbourhood, I appoint a stand. I thought a cabstand might very conveniently be placed in Eaton-square, where there is a road through to the centre of the square, but I found that everybody in Eaton-square would have petitioned against it.

219. Lord *Stanley of Alderley.*] Why did they object to it?

They said that it was a nuisance to ladies walking in the square. I believe that every resident in the square would have petitioned against it. It would be very convenient to establish a cabstand in Belgrave square, but I should be met there by the same opposition; there is no cabstand between Hyde-park Corner and Pont-street, on that side, or Grosvenor-place west, leading on to Eaton-square. Unless people in the immediate neighbourhood want a cabstand, I have generally refused to appoint one. I did appoint one in St. James's-square.

220. I have been requested by the Marquess of Westmeath to ask you this question. Seeing that there is extreme difficulty in convicting drivers of vehicles when

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when they run over people, the cart driving swiftly away, and there being no means of identifying the cart, would it be sufficient in order to procure a conviction from the magistrates, that you should produce two dispassionate witnesses who should state that the driver was driving at a dangerous rate?

That is more than I can answer; I should think it ought to be, but how the magistrates might view it I cannot say.

221. Have any cases been brought before the magistrates for driving violently?

Frequently, for what is called furious driving; the law is not very definite upon it. The words of the 46th section of chapter 47 of the 2nd and 3rd of Victoria are, "Every person who shall ride or drive furiously, or so as to endanger the life or limb of any person, or to the common danger of the passengers in any thoroughfare."

222. Butchers' carts always drive furiously, do they not?

Yes, several of them have been fined; and about this time of the year I always have notices printed cautioning them.

223. Lord *Methuen.*] The railway waggons drive at a very rapid rate, do they not?

I think they are the worst of all; they are generally badly driven, and they go at a considerable pace.

224. Lord *Stanley of Alderley.*] For the purpose of the more easy identification of persons furiously driving those carts, do you see any objection to requiring to be painted on the tail-board of such carts, in large and clean letters, the name and address of the owner.

That would certainly tend to facilitate the finding them out.

225. You see no objection to that?

No. With respect to cabs, there is a provision in the law, which I find is a dead letter, but which would be very useful if acted upon, namely, requiring a ticket to be given to the hirer of the cab. The magistrates have decided that that may be given at any time during the hiring, and that no person can complain but the hirer. Now I think, if it is desirable to continue that provision, the cabman should be liable to be convicted upon proof that a ticket was not given at the commencement of the hiring, for that would lead to identification, not only in cases of crime but in cases of loss of property and incivility. At present the police have great difficulty in finding out a cabman against whom a complaint is made or in whose cab property has been left.

226. Are there many cases in which drivers of hackney carriages are connected with thieves and other people of bad character?

There are always a certain number, but if we find them out, never let them have their license again.

227. On the other hand, are not there many cases where great honesty is shown in restoring property?

Very great; there is a Lost Property Office at Scotland Yard, and it is really extraordinary to see the number of things, sometimes of very considerable value, which are brought there; sometimes even money, which it would be very difficult to trace to the man if he appropriated it.

228. *Chairman.*] You do not wish to give any evidence upon the next clause relating to the removal of snow?

No; I am no more authority upon that point than anybody else, but perhaps I might be allowed to make this observation, that the present law, which seems to be strong, is really quite inefficient. Paragraph 6, section 60, of the 2nd and 3rd of Victoria, c. 47, is as follows: "Every occupier of a house or other tenement in any town within the said district who shall not keep sufficiently swept and cleansed all footways and watercourses adjoining to the premises occupied by him, and if any tenement be empty or unoccupied, the owner thereof shall be deemed the occupier with reference to this enactment." That would apply to cases of snow, but the snow usually has disappeared before we can get the summonses heard, so that in truth it is quite inefficient.

229. *Chairman.*] Proceeding to the 19th clause, have you numerous com-

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plaints made to you of the present inefficient state of the law for preventing serious accidents from dogs straying in the streets?

Certainly; every year, especially as the hot weather comes round, there are great complaints. The present law is very inefficient. With regard to ferocious dogs this is the only provision at present, "Every person who shall turn loose any horse or cattle, or suffer to be at large any unmuzzled ferocious dog, or set on, or urge any dog, or other animal to attack, worry or put in fear any person, horse, or other animal, shall be subject to a penalty. It is quite obvious that there are a great many dogs in the streets which have no owners, at all events the owners cannot be found by the police, or anybody who wants to find them, so that a dog may be ferocious and unmuzzled and there are no means of punishing the owner, and what is more, no means of prevention; a dog may go about and cause an immense amount of mischief, and there is no power to prevent him; he bites one child, and goes away and bites another, while you are endeavouring to find the owner.

230. Earl of *Kimberley.*] Will there be any notice given by the police as to those dogs, so that persons who lose dogs may have an opportunity of reclaiming them before the period has expired within which they may be sold or destroyed?

There might be a sort of dog gazette so that everybody would know where to hear of his dog.

231. Earl *Granville.*] The police would use some discretion, I presume, when a valuable dog, for instance, had strayed they would hardly kill the dog in three days?

No.

232. Earl of *Kimberley.*] Would there be any objection to advertising publicly that such and such a dog had been taken by the police?

I think, practically, everybody would know in a short time where the receptacles of the dogs were, to which people could go and inquire, but there would be no objection to having them advertised in the way suggested; at every police station there might be a list of them kept.

233. *Lord Steward.*] Are there any powers at present enabling the police to require dogs to be muzzled?

No.

234. Would not prevention be better than cure?

Yes; but many persons consider that a bad provision, and that muzzling drives a dog mad very often. In Paris, they put a tin muzzle on the dog, so that he can breathe; but muzzling the dog in such a manner as to close the mouth, is very bad.

235. That is a mere question as to the nature of the muzzle; but at certain periods of the year, supposing hydrophobia to be prevalent, would not it be desirable to require all dogs to be muzzled a certain time?

Yes, I think so. There is a provision about mad dogs in the 2nd and 3rd Victoria, c. 47, section 61, "It shall be lawful for any constable belonging to the metropolitan police force (and there is the same provision in the City Act) to destroy any dog or other animal reasonably suspected to be in a rabid state, or which has been bitten by any dog or animal reasonably suspected to be in a rabid state; and the owner of any such dog or animal who shall permit the same to go at large after having information or reasonable ground for believing it to be in a rabid state, or to have been bitten by any dog or other animal in a rabid state, shall be liable to a penalty of 5 *l.*" It is very vague.

236. *Chairman.*] You think it better that you should be able to destroy a dog if you cannot find the owner?

I think so.

237. Earl *De Grey.*] Is it intended that each individual policeman should have power to destroy a dog at his discretion at the end of the three days?

No, it would be done, of course, subject to regulations.

238. Would they be general regulations, to be applied at the discretion of a particular policeman, or would he report to your office that there was a dog

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taken, and receive his orders from the central office that the dog was to be destroyed?

Of course that ought to be done. It would be necessary to appoint certain places in the nature of kennels, to which dogs would be sent, and then reports of their description would be made, and whether they would be likely to be claimed, and then the destruction would be by order. No dog should be destroyed without a positive order.

239. Then, practically, a dog which was obviously a valuable dog, belonging to a private individual, would not necessarily be destroyed at the end of three days?

No.

240. Lord *Methuen*.] How is it proposed that the expense of keeping the dogs should be defrayed?

There is provision for that; it would be paid under the general provisions of the Act.

241. Lord *Stanley of Alderley*.] Are there not some words at the end of the clause that destroy the efficiency of it, namely, these words, "Nothing in this section contained shall prejudice the right of any person to bring any action or institute any other legal proceeding which he might have brought or instituted if this Act had not passed"?

There is a question upon that, but I suppose it means to bring an action against anybody who had got the dog.

242. Earl of *Kimberley*.] With regard to notice being given of the dogs taken possession of by the police, would there be any objection to insert in this clause a provision, that there should be a register kept at certain chief police stations, which should be open to the inspection of the public?

There would be no objection to that; in fact there is no doubt it would be done.

243. *Chairman*.] Have you any remarks to make upon section 20?

Section 20 is merely to get rid of the evasion of a provision in the Act of the 2nd and 3rd of Victoria.

244. If a fair is holden in one field this year, and the person who holds the fair illegally moves into the next field next year, the law as it stands does not cover such a case?

Just so.

245. *Chairman*.] Have you any remark to make on the betting clause?

The assemblage of betting men is a very great nuisance in many parts of the City, and also in other parts of the metropolis, for instance, in Windmil-street and Coventry-street; the law was so stringent against men betting in rooms or houses that they have been driven into the streets, and that has been the cause of a great nuisance there. There is a little assemblage every day within Hyde Park; in fact, there was a decision of Lord Chief Justice Erle, in the Court of Common Pleas, that that Hyde Park assemblage was within the law; that was over-ruled, so the evil continues. One of the evils of this betting in the streets is the temptation to persons to assemble for betting. I believe gentlemen's servants assemble in Hyde Park and bet largely, and it leads, besides the obstruction, to thefts and pawnings; no doubt it is a considerable source of evil among a certain class.

246. Lord *Stanley of Alderley*.] Under that clause, if any two or more gentlemen make bets in front of their club, would not they be liable to be taken up?

I should think they would. There is one matter which I wish to call attention to; there is no distinct provision for the machinery for putting this Act into execution; there are very large powers given which must be exercised by the Commissioner of Police or the Assistant Commissioner. That will entail a large amount of work upon them in addition to the very heavy duties which already devolve on both of them. There is no provision whatsoever made for the employment or payment of any person for carrying this Act into execution.

247. You think that you ought to be able to employ a sufficient number of superintendent inspectors to superintend the metropolitan traffic?

Yes.

Sir *R. Mayne*, K.C.B.

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248. Could not some of your present officers perform the duty?

They are already overloaded; in fact, everybody in the police force, from myself downwards, is taxed very nearly to the utmost limits. By the 16th & 17th Victoria, c. 33, there was some provision made for the payment of attendants; and by an arrangement made afterwards, there was a gentleman appointed, having no legal power, who was called the chief inspector of public carriages; and there were police inspectors, specially employed, appointed under him. The Inland Revenue provide money for the payment of those; in fact, about 12,000 *l.* or 13,000 *l.* is specially provided in the estimate of the Inland Revenue for those duties. There is no provision whatever in this Act for putting it in execution.

249. *Chairman.*] You are aware that if any provisions of that sort are to be introduced into the Act, they must be introduced into it in the House of Commons?

Yes, I am aware of that; in fact, I had intended to say so; but I mention it here in order that it should not appear to be an after-thought. I have from the first respectfully protested against being called upon to undertake those duties.

The Witness is directed to withdraw.

Ordered, That the Committee be adjourned till To-morrow,
One o'clock.

Die Veneris, 22° Februarii, 1867.

PRESENT:

LORD STEWARD.	Earl GRANVILLE.
Earl of AIRLIE.	Earl of KIMBERLEY.
Earl STANHOPE.	Lord METHUEN.
Earl of LUCAN.	Lord STANLEY of ALDERLEY.
Earl of BELMORE.	Lord EBURY.
Earl DE GREY.	Lord HOUGHTON.

The EARL OF BELMORE IN THE CHAIR.

COLONEL JAMES FRASER, called in; and Examined, as follows:

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250. *Chairman.*] You are the Commissioner of Police within the City of London?

I am.

251. You are consequently well acquainted with the traffic in the City, and the conditions under which it is carried on?

I am quite familiar with them.

252. Will you be kind enough to inform the Committee, by whom the regulations in the City, with regard to scavengering, are made?

They are made by a body called "The Commissioners of Sewers," who are members of the Court of Common Council, and are appointed specially by that body to conduct and manage the paving, lighting, and cleansing of the City under an Act of Parliament, "The 11th and 12th Vict. c. 163," a local Act.

253. What are the regulations now in force?

They prescribe that every street and place, except certain main streets which are enumerated afterwards, about 50 in number, are from April to September, both included, to be cleaned between four o'clock in the morning and one o'clock in the afternoon, and from October to March, both included, between five o'clock in the morning and two o'clock in the afternoon. The main streets, before spoken of, are to be begun to be cleaned not earlier than four o'clock in the morning, and finished not later than nine o'clock on the morning of each day, and also to be cleansed on every Saturday afternoon or evening, at such hours as shall be directed by the inspector of the district. The contractors are also required to cleanse any of the above-mentioned streets or places (that is to say, the 50 which I have spoken of) a second time in any one day by a machine drawn by a horse or horses, whenever the same may from any cause require it; and when the mud is of a thick adhesive character, the contractor is required to water the carriage-way before sweeping it, so as to enable him to cleanse the same more effectually. With regard to dusting, the contractors are required to call at every house, at least twice in every week, to ascertain whether the occupiers require the dust, dirt, ashes, &c., to be taken away, and they are to do so without receiving any reward. This is to be done before 10 o'clock in the forenoon at the houses situate in the main streets of the City, included in the list before recited. The streets which are required to be cleaned before nine o'clock in the morning, are Adelaide-place, Aldersgate-street, Aldgate, Aldgate High-street, Barbican, Beech-street, Birchin-lane, Bishopsgate-street, Bread-street, Budge-row, Cannon-street, throughout; Cheapside, Colemanstreet, Cornhill, including the paved area at the western front of the Royal Exchange, Earl-street, Eastcheap, Farringdon-road, Farringdon-street, Fenchurch-street, Finch-lane, Finsbury-place, South Fleet-street, Friday-street, Gracechurch-street, Gresham-street, East and West Holborn, Holborn Hill and Bridge, Houndsditch, King William-street, King-street, Cheapside, Leadenhall-street, Lombard-street, London Bridge, Long-lane, Lothbury, Ludgate-hill, Mansion House-street, Mark-lane, Mincing-lane, Minories, Moorgate-street, New Bridge-street, and Chatham-place east and west, Newgate-street, Old Bailey, Old Broad-street, Pavement, Finsbury, Poultry, Princes-street, Queen-street, St. Ann's-lane, St. Martin's-le-Grand, St. Paul's Churchyard, Skinner-street, Threadneedle-street, Throgmorton-street, Tower-street, Upper and Lower Thames-streets, and the steps from King William-street, Watling-street, and Wood street.

254. Lord *Stanley of Alderley.*] Does that list include all the streets of the greatest traffic?

Yes.

255. *Chairman.*] With regard to clause 5 of the present Bill, are the prohibitions which are proposed in that clause, although they may, to some extent, interfere with the existing regulations, nevertheless calculated to relieve the street traffic and to promote the public convenience?

I think they are, and for this reason, that many of the streets which are not required to be cleaned until one o'clock in the afternoon are now very much thronged with traffic, and dust and dirt being collected in these streets interfere very much with the through traffic; in addition to which the carts, when filled, pass through the main thoroughfares on their way from one place to another, and so cause additional obstruction. I therefore think it would be very desirable that the provisions of this clause should be carried out, if possible, in the other streets of the City, as well as in those enumerated in the list which I have read. The clause in this Bill gives leave to clean all streets up to 10 o'clock in the morning; whereas the principal streets in the City are now cleaned before nine o'clock in the morning, and it appears to me to be desirable that they should not be cleaned later than nine o'clock; the principal streets at all events, as is the case now.

256. Do you think that the effect of this clause would be to repeal the existing bye-laws of the City?

Yes; because this is an enactment: it says, "no person shall, between the hours of 10 in the morning and seven in the evening, except in such streets as may be approved by the Commissioner of Police, remove any ashes, dust, or refuse from any house, or sweep or clean any streets, or remove any mud, litter, or other refuse from any street." It is an enactment, and would certainly interfere, to some extent, with the regulations which were made by the Commissioners of Sewers.

257. Lord *Stanley of Alderley.*] But these regulations to which you have been alluding only apply to the sweeping of streets, and to the removing of dust; are there any regulations which apply to the passing of heavy traffic, and of goods through the streets?

Yes; but they are not made by the Commissioners of Sewers; these regulations only are made by the Commissioners of Sewers.

258. There are regulations which your police carry into effect, with respect to the carriage of heavy goods through the streets of the City of London?

Yes; there are three bye-laws which were made under an Act, called "The City of London Traffic Regulation Act, 1863."

259. Will you be good enough to tell the Committee what those regulations are?

Only three bye-laws made under that Act were approved by the Secretary of State; 17 bye-laws were submitted for the Secretary of State's approval, and he declined to confirm more than three of them, saying that the powers under the Act were not sufficient to allow the others to be framed; and these are the three which are now in operation. The first is, "Every omnibus, metropolitan stage-carriage, van, or other carriage, licensed for the conveyance of passengers at separate fares, passing eastwards through St. Paul's Churchyard,

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Churchyard, and proceeding to, or whose destination as stated on such vehicle, or in its license, shall be, London Bridge, or to any place over London Bridge, shall, when it reaches the south-east corner of St. Paul's Cathedral, pass down Cannon-street, and thence over London Bridge; and every such carriage making the reverse journey shall traverse the like route; and the driver of every such omnibus, metropolitan stage-carriage, van, or other carriage, licensed for the conveyance of passengers at separate fares, shall drive the same pursuant to this regulation." The second bye-law is, "No person shall drive any cart, waggon, dray, or other vehicle, for the conveyance of goods, wares, and merchandize through the streets, between the hours of nine in the morning and six in the evening, laden to a greater height than 16 feet, measuring from the ground, or laden to a greater width than seven feet, or the breadth between the outsides of the wheels of which vehicle (except it shall have been in use before or on the 28th day of July 1863) shall be greater than seven feet." The third bye-law is, "No person shall drive any cart, waggon, or other vehicle wholly or partially laden with timber, scaffolding, or other poles, logs of wood, masts, spars, or other articles or things, whether consisting of wood, metal, or any other material, exceeding 25 feet in length, or eight feet six inches in breadth, through any street between the hours of nine in the morning and six in the evening."

260. Are those regulations now in force with regard to the delivery of coals and other heavy goods passing through the City?

Not with regard to the delivery of coals.

261. What regulations exist with regard to the delivery of coals?

There are no regulations whatever; there is no law upon the subject of the delivery of coals. There is a custom in the City, which prevails to some extent, of delivering coals before nine o'clock in the morning, but it is quite optional; there is no regulation on the subject; and coals are frequently delivered at a much later hour, and the practice impedes the traffic of the streets considerably.

262. Is it not the fact that, practically, persons are prevented from delivering coals in the morning in great thoroughfares like Fleet-street and Cheapside?

There is no law to prevent their doing so; the only way in which obstructions of that kind can be dealt with is under a clause in the City Police Act, which enables persons to be summoned who allow their vehicles to remain longer than is necessary for loading or unloading.

263. Is No. 2 of the proposed regulations in force, by which all persons are prohibited from driving a vehicle between certain hours with goods of a nature so heavy as to require more than four horses to draw it?

No; that was one of the bye-laws not approved. There is no law to prohibit it now; it is proposed to make an enactment under this Bill for that purpose.

264. Clause 4 in the proposed bye-laws is, "No person shall drive any cart, waggon, dray, or other vehicle for the conveyance of goods, wares, and merchandize through the streets, between the hours of nine in the morning and six in the evening, laden to a greater height than 16 feet, measuring from the ground, or laden to a greater width than seven feet, or the breadth between the outsides of the wheels of which vehicle (except it shall have been in use before or on the 28th day of July 1863) shall be greater than seven feet"?

Yes, that is one of the present bye-laws; but, as your Lordship will see, it does not apply to any vehicle which was in existence on the 28th of July 1863, and the consequence is, that many vehicles of a much greater width than that are going through the streets of the City at all times, and they will be in existence, I have no doubt, for many years to come.

265. These other bye-laws are what you proposed, which were not sanctioned by the Secretary of State?

Yes.

266. In clause 6 of those bye-laws you proposed to prevent the delivery between certain hours of any goods in certain great streets enumerated therein; that is not now carried into effect; but under the proposed Bill it would be

carried into effect, not only with regard to those streets, but with regard to all streets within the City; in your opinion would it be sufficient if those enumerated streets were the only streets in which the law should come into operation, leaving the delivery free, as it is now in the smaller streets?

Many of these streets are the principal streets in the City; but many others also are very crowded, portions of which, I think, it would be necessary to include within the special limits of this Bill.

267. Do you think that it would be sufficient to include a certain number of streets, adding such others as you think necessary to that schedule, as the streets in which the clause should come into operation, leaving it as it is at present with regard to the rest?

Quite so. I am not at all of opinion that it is necessary to enforce the provisions of that clause in all the streets of the City, but only in the streets where the traffic is very considerable, where the streets are narrow, and where anything standing still completely obstructs the whole traffic, so long as it is motionless.

268. Then am I to understand you that if those streets, with such others as you may think necessary, were enumerated in a schedule, it would be sufficient to obtain the objects which this Bill has in view: I refer to the loading of coals, and the delivery of beer, and other matters?

To a great extent. Clause 6 applies to coal, and to casks of all sizes; and it strikes me that the provisions of it are very stringent indeed, unnecessarily so; because they would apply to a cask which a man might carry in his hand. It seems to me that it would be desirable to make some regulation with regard to the cubical contents of casks, but not to make any stringent regulation with regard to a cask which might be carried by two men across the pavement. What chiefly causes the obstructions by casks is their being let down into cellars, by means of ropes and chains across the footway, and being drawn up, as they are now drawn, by means of horses, when they have not the advantage of an inclined plane, crossing the footway at all hours of the day. If this clause should be enforced, as it is now proposed, I think that it would act very injuriously upon the wine trade in particular; indeed, I do not quite see how it could take effect in the City without putting a stop to a great deal of what is now done by wine merchants, because they cannot get their wine out of the docks except between certain hours. In winter the docks are only open at nine o'clock in the morning, and in summer at eight o'clock; and therefore it would be necessary, under this clause, that all wine should be got from the docks, and lowered into the cellars between the hours of nine and ten, which it would be almost impossible to do, and for this additional reason, that the wine is chiefly lowered and housed by men belonging to the Vintners' Company, who have a sort of privilege, and who are chiefly employed by wine merchants; and I think that their numbers would not be sufficient to enable wine merchants to get these large and heavy casks lowered into their cellars before 10 o'clock in the morning, even if they were disposed to do it. With regard to the opening of the docks: even if the docks were opened at an earlier hour, I understand that there would be a difficulty about the attendance of the Custom House officers; that they would not be there.

269. Then it is your opinion that it would not be desirable or practicable to enforce the regulations of clause 6, with regard to the delivery of smaller casks and wine, and such other goods as can now be conveniently taken across the footpath by the men employed in loading or unloading the casks?

No; I think it would be very desirable to relax the stringency of this clause to that extent, not so much with regard to coal as with regard to wine and foreign spirits. With respect to beer, it might be enforced much more stringently than with respect to wine or spirits, because beer can be brought in at any time in the morning or evening. When this Bill was under discussion before, and when the City promoted a Bill with a clause somewhat to this effect, some of the large brewers wrote and said that they did not so much object to the provisions of the clause as affecting the large casks of beer, but that it would act injuriously if they were altogether prevented from delivering a small cask of beer by retail. Indeed casks, however heavy they may be, do not

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not cause greater obstructions than many other descriptions of goods which are now constantly loaded and unloaded in the City, and to which I think this rule might also well apply if their cubical contents were beyond a certain measure. For instance, an iron girder, or a tremendously heavy safe, which is now moved with ropes and a regular tackle requiring six or seven men to lower it, occupies the street for an hour or two hours, or more, and in the busiest part of the day. All these articles occasion just as much inconvenience as casks. I think that the rule might very well apply to empty casks, because there is no reason why empty casks might not be taken away early in the morning or late in the evening, but practically, I think, it would be impossible to apply this clause as it stands without greatly injuring the wine trade.

270. Then is it your opinion that the wine trade should be exempted from the operation of this clause, and that with regard to casks and other things of that kind, there should be a limit to the size which should be affected by this clause?

I think that it would be desirable to make some regulation with regard to the cubical contents of large casks and other packages, which should be loaded and unloaded in certain streets between particular hours.

271. You would be inclined to establish no regulations except what now exist, with regard to the delivery of coals, or of wine, or of beer, in those streets which are not the main thoroughfares of the City?

There are no regulations now affecting them, except a single clause in the Police Act, applying to all vehicles which may be longer than necessary in loading or unloading.

272. Then you would not think it necessary to alter the law with regard to those streets; and with regard to the main streets, you think that this clause might be limited to the operation upon casks of certain cubical contents; have you any idea what those contents might be?

I have a letter from wine merchants in a very large way of business, who write as follows:—"Having regard to a Bill now before the Legislature, to regulate the traffic, &c. of the streets in the metropolis, and for the prevention of inconvenience or accidents to foot passengers, we have thought it desirable to solicit your attention to some of the proposed provisions which seem to us unduly to trammel industry, without any occasion or corresponding advantage. The restrictions upon the loading and unloading of bulky and ponderous goods do not appear to embrace the main question of dimensions in description; and although they include 'casks' under a general definition, they do not comprise all those large bales and cases of dry and fancy goods, pianofortes, &c., which are constantly loaded and discharged across crowded footways at the doors of many eminent houses in our immediate neighbourhood. Such bales and cases are mostly of between 30 and 70 cubic feet in measurement, and as they are handled slowly and with difficulty, they do interpose obstruction and danger. The same remark would apply certainly to 'casks' of large size, such as butts, pipes, tuns, puncheons, hogsheads, tierces, &c. of wine, spirits, beer, sugar, tobacco, &c., of capacities ranging from 10 to 30 cubic feet. But the objection does not apply to small 'casks' (comprised in the proposed prohibitions under the general definition of 'casks'), such as quarter casks, octaves, &c. of capacities of less than five cubic feet each." That is the proposal of wine merchants who are living in Cheapside, in the most crowded part of the City; they themselves seem to be willing to be placed under restrictions with regard to heavy casks of the description which they specify here, provided they were free to load and unload smaller ones.

273. And you agree in opinion that it would be sufficient to limit the prohibition to casks and other packages of that larger class?

I think that it would.

274. You think that the Bill should be altered in that respect?

Yes, I think that a clause might be framed considerably relaxing this provision. It is proposed by this clause that no coal shall be loaded or unloaded, except between the hours of one and ten o'clock in the morning. I think that the hours might be very well extended to from six o'clock in the evening till

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nine o'clock in the morning, or even ten o'clock in the morning. Nine would be better, because at ten o'clock in the morning the main streets are extremely crowded.

275. That would only be giving the parties a longer period during the night for performing these operations; it would not be giving them more daylight?

In summer it would be giving them a great deal more daylight, because it is not dark till nine o'clock, and a great deal of work is done at night now, in a variety of trades; I certainly think that the clause, as it now stands, will injuriously affect the interests of certain trades, and leave others untouched, which create just as much obstruction as people who send about their goods in casks.

276. At the same time it is not your opinion that those regulations are necessary for the preservation of the free traffic of the City?

Not to the extent which is proposed by this clause; I think that they are necessary, to a certain extent, and that it is quite desirable that there should be an enactment providing against many of the obstructions which are now occasioned by casks and heavy goods, but not to the extent which is proposed by this clause, either with regard to all casks, or with regard to the hours which are specified in this clause.

277. *Chairman.*] Do you think that a distinction might be drawn between casks which are merely unloaded across the footway, and casks or any other heavy goods which are let down into cellars by ropes across the pavement?

Quite so.

278. Earl *Stanhope.*] You have given us an opinion with regard to the wine trade; do you extend that opinion to the brewing trade?

No, because persons in the wine trade are placed in a peculiar position; they cannot get their wine delivered from the docks, except between certain hours, whereas the brewers are not at all under those restrictions.

279. As regards the brewing trade, do you imagine that they would be put in a position of undue hardship by the operation of this clause?

I have no doubt that it would affect them to some extent, but I fancy that the provisions of any Traffic Bill must, more or less, press hardly upon private interests. In the City, at this moment, we do not suffer so much from the delivery of beer as we do from the delivery of coals; I think that, as a rule, the brewers now manage to deliver their beer before nine o'clock in the morning, and I believe that in the borough of Southwark, under some local Act which they have there, they are compelled to do so.

280. Earl of *Kimberley.*] Do you not think that it might be more convenient that a discretion should be left to the Commissioner of Police to fix the size of the casks, and to make such regulations with reference to this clause as experience might suggest to him?

I think that that would be more desirable still, because it would prevent the necessity of being bound by an Act of Parliament which you could not perhaps very well repeal, whereas if a discretion were left to the Commissioner of Police, he would be able from time to time to judge how far it was necessary to enforce even a regulation of his own, and to alter or amend it as might become necessary. The condition of the traffic is changing every day; the railroads affect it considerably. Every new station of a railway causes a stream of traffic from it through streets through which, perhaps, there was no great traffic previously, and, if you were bound by an enactment, it could not be altered without going to Parliament again.

281. Do you not think that in working any clause it would probably be found that many unforeseen circumstances arose, and that it would be necessary to have communication with the different trades, and so to alter the regulations as would be found to suit their convenience and that of the public?

Yes; I think that would be desirable if you could reconcile the two interests, but, generally speaking, they are so antagonistic that that would be difficult.

282. It is not probable that in any Bill you can see what will be the detailed arrangements?

That is quite true.

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283. Lord *Stanley of Alderley*.] Do you not think that you can regulate many details by bye-laws. There are some points which, I collect from your former evidence, you think should not come under the proposed enactment, namely, as to packages of a certain size; and, in your opinion, the law need not be altered as regards the delivery of coal and such traffic in any streets, except the main streets which are enumerated in a schedule?

Discretionary power is proposed by this clause to be given to the Commissioner of Police "in such back streets or other bye-ways." If the word "back" were struck out, it seems to me that it would effect the desired object; speaking for myself, I think that I should exercise such a discretion very widely indeed; it would be an invidious duty to undertake to prohibit people from conducting their business; and except in the main streets where they seriously interfered with the convenience of the public, I do not think that such a clause as that would be over rigorously enforced, so long as a discretionary power was left in the hands of the Commissioner of Police.

284. Earl of *Kimberley*.]—With reference to the coal delivery, do you not think that it would be sufficient if you prohibited the coal from passing through certain streets in the City, leaving coal merchants who had seaborne coal at wharves upon the river, to send that coal to their customers?

I do not think that it would be necessary to enforce any stringent provisions with regard to the passage of coal. So long as the traffic is moving there is not much difficulty in regulating it, but in a narrow street where there is perhaps only room for two vehicles to pass, if one is standing delivering coal for an hour (and it is frequently longer than that), it entirely puts a stop to the passage of the public. If the waggons are passing through the streets, although they impede the traffic, they do not actually stop it.

285. You rather contemplate regulations applying to loading and unloading? Yes.

286. *Chairman*.] Will you turn your attention to clause 7, and tell the Committee whether the provisions of that clause are requisite to prevent obstruction to the traffic and inconvenience to the public?

I think that they are quite requisite. A practice exists to a great extent of placing empty packages—casks, for example—in front of shop doors, under the pretext of housing them, but in reality as advertisements, to lead to the belief that people are conducting a large business, which is not the case, and they cause considerable obstruction; this is not only felt within the City, but I believe it is felt in other parts of London. In many parts of the City it is occasionally a great nuisance, and I think that that clause is a very desirable one. There is no way under the Police Act of reaching the people who do this; the only law which at all bears upon it is a clause in Michael Angelo Taylor's Act, which requires a sworn information, and rather a roundabout process; and therefore I think that this clause is very needful.

287. Lord *Stanley of Alderley*.] Are there many places within the City where persons lay claim to the ground between the footpath and the roadway?

I am not aware of one.

288. *Chairman*.] I think that those cases are nearly all in the suburbs?

Chiefly, I think; in fact, the ground is too valuable in the City to allow of such a thing as that.

289. Lord *Stanley of Alderley*.] Are there any sorts of markets held in the City like that which is held in Oxford-street upon the footpath, or upon the margin of the highway?

No, that is not allowed; there are no such established places as there are outside the City.

290. *Chairman*.] Are there any rules now in force within the City with regard to the driving of cattle?

Yes.

291. What are those rules, and by whose authority are they made?

The rules and orders and regulations, with regard to the driving of cattle, are made under an Act called "The Metropolitan Market Act of 1857;" that

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Act prescribes that the Commissioner of Metropolitan Police, and the Commissioner of City Police, with the consent of the Court of Common Council, may make such rules, orders, and regulations as they may deem expedient for the driving of cattle within the City of London; and certain rules and regulations were made under this Act of 1857 by the Commissioner of Metropolitan Police, in conjunction with the then Commissioner of the City Police. As the Metropolitan district entirely surrounds the City, they communicated with each other, and arranged upon certain streets and routes by which cattle should be driven to the Metropolitan Market. But in consequence of the Act requiring within the City that the consent of the Court of Common Council should be given to any rules which the Commissioner of the City Police might make, the Commissioner of Police of the Metropolis had his rules enforced two years before the Commissioner of the City Police was able to obtain the consent of the Court of Common Council, and at this moment no rules have been made with regard to the time during which cattle shall be driven in the City; the only rules which exist are rules made under the authority jointly of the two Commissioners of Police, for driving cattle within certain hours to the Metropolitan Cattle Market; but there are no regulations in force, so far as the City is concerned, with regard to the hours during which cattle shall be so driven, nor are the routes specified by which they shall be driven from the Metropolitan Cattle Market; and some such rule as is proposed in this clause is very necessary, for cattle, and sheep especially, are driven at all hours to Newgate Market. There are slaughter-houses in and near Newgate-street, which at this moment, being one of the chief thoroughfares of the City, is constantly obstructed by sheep and calves especially; not so much by bullocks. Bullocks are driven from the Metropolitan Cattle Market across Farringdon-street, and across the bottom of Ludgate-hill, and across the bottom of Holborn-hill.

292. Where do they go to from there?

They go across Blackfriars Bridge, and so to the suburbs outside the City.

293. Therefore, would it not be very desirable that there should be one set of rules for the City district and the Metropolitan district?

Practically, that is so now. The Commissioners of Police have agreed upon the routes by which cattle shall be driven to the market; but if this clause should become law, it would enable the Commissioner of Police to decide upon the hours during which, and the streets through which, cattle should be driven from the market, as well as to it, and prevent obstructions, which are constantly caused now for want of some such power.

294. Is it not the case at present that a rule is in force in the Metropolitan district that no cattle shall be driven through the streets after 12 o'clock?

The rule is that they shall not be driven after 10 o'clock, but it is not enforced until 12 o'clock; the consequence is, that up to 12 o'clock any cattle may be driven to the confines of the City, and we must allow them to pass through it, if they are going to the market. By the time that they reach the other side of the City, they are infringing Sir Richard Mayne's regulations, because he says, in one of his rules, that after 12 o'clock the law is to be enforced. But if animals arrive at Blackfriars Bridge, for example, a few minutes before 12 o'clock, we are obliged to admit them, we can do nothing else; and after that time they are driven through to the Metropolitan district again.

295. Lord *Stanley of Alderley.*] What becomes of them?

They are received, and are passed on to the market.

296. That, as I understood you, is an infringement of the rule?

Yes; and it is unavoidable, because we are in the very middle of Sir Richard Mayne's district.

297. Lord *Methuen*].—Would that clause enable you to mark the route by which the cattle should go?

It says, " Except with the license of the Commissioner of Police." The bye-law of the City already prescribes the route which is now in force, but after seven o'clock in the evening it would be almost immaterial through what streets in the City the cattle were driven. I do not think that it would very much interrupt the traffic. I, however, think that the clause is quite necessary.

298. *Chairman.*] Are there any regulations now in operation in the City similar to those which are proposed in the three paragraphs of clause 9?

The first paragraph as far as the word "metal," namely—"Drive or conduct along any street any cart, carriage, or other vehicle laden with timber, iron, metal, or any other article exceeding in length 25 feet, or in breadth 8 ft. 6 in., or any cart, carriage, or other vehicle laden with timber, iron, or metal," is now in operation in the City under the bye-law which I have already quoted, which is made under the Act of 1863, but the last portion of the proposed paragraph, "or any other article protruding more than three feet behind or in front of the vehicle, or more than one foot from the sides of the vehicle," is not in force; there is no rule to that effect in existence.

299. Do these regulations, as far as they are in effect, operate beneficially?

That one operates very beneficially. It was the constant practice to draw large logs of timber, 40 or 50 feet long, with a string of four horses from south to north, chiefly over Blackfriars Bridge, intersecting the two main streams of traffic in the City from Holborn and Fleet-street. It was in consequence of that, that this bye-law was made under the Traffic Act of 1863, and it is now in operation, and it acts very beneficially, so far as the traffic of the City is concerned. The last portion of the paragraph prohibiting any article "protruding more than three feet behind or in front of the vehicle, or more than one foot from the sides of the vehicle," I think is drawing it rather close; three feet is a very small projection in front of or behind a cart; short timber carried upon a cart projects in front almost to the horse's head. I am afraid that this provision would prevent timber being carried in that way.

300. What number of feet would you suggest as a better number to be taken?

I think that you might certainly extend it to eight feet, at any rate, and that would not be objectionable, provided, of course, that the length did not exceed in all 25 feet. I think that three feet projecting from the end of a cart is very short.

301. Do you think that the prohibition contained in the second paragraph is necessary?

Yes; I think that it is equally necessary with that contained in the first. That applies to ladders or scaffold poles, exceeding 25 feet in length. In fact it repeats, with regard to articles carried on foot, the prohibition which is contained in the first paragraph with regard to articles carried in vehicles.

302. Lord *Stanley of Alderley.*] In point of fact the first paragraph would include the second; it prevents anything being carried which is of a length above 25 feet?

The first paragraph only applies to carts and carriages, and other vehicles laden with these things. The second paragraph applies to things being carried on foot.

303. Lord *Methuen.*] Does that merely apply to the road itself? Could four men carry anything exceeding 8 ft. 6 in. in width along the pavement?

Not by this clause. I think the meaning of the word "street" is not very distinct. The interpretation is, that the word "street" "shall include any highway or other public place, whether a thoroughfare or not." I think that it would not include the footway. It constantly happens that a man carries the carcase of an ox upon his shoulders along the footway, and every one must get out of his way in the same manner as out of the way of a chimney-sweep.

304. Lord *Stanley of Alderley.*] Would not that second paragraph prevent the carrying of fire-escape ladders?

Fire-escape ladders are all carried upon wheels; all over the City there are fire-escape stations, and the ladders are moved out every night, not upon the footway, but upon the roadway, on wheels.

305. Earl *Granville.*] They, of course, would be licensed by the Commissioner of Police?

The Commissioner of Police would not interrupt them.

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306. Lord *Stanley of Alderley.*] With regard to a vehicle not being allowed to be drawn by more than four horses, is it not frequently the case that packages from a railway station would require more than four horses to carry them?

No. I think that the ordinary goods carried by railway vans never, or very rarely, require four horses. That clause was introduced into the Bill which the City brought forward last year, and its object was to prevent the carriage of enormous blocks of stone, or iron girders, which sometimes require 10 or 12 horses to draw them, and which, when they are merely going in a straight line at the intersection of any street, block the passage altogether; but when they turn an angle they can only perhaps bring the wheelers, or four of the horses, to bear upon the block. As a rule, it sticks at the corner, and entirely stops the traffic.

307. Earl of *Kimberley.*] In the paragraph as to ladders, might it not be desirable to make an exception with respect to ladders used for escape from fire?

The police have always the power of taking proceedings; I think that perhaps the word "license" here is rather objectionable, and that it might be "permission," the same as in other clauses; because people might imagine that a formal license was required.

308. *Chairman.*] In point of fact, with regard to the driving of cattle, although the law says that they are not to be driven after 10 o'clock in the morning, they are driven until 12 o'clock; because the Commissioner of Police of the Metropolis has given directions to his subordinates not to take out summonses in the case of cattle driven before that hour.

That is so in the Metropolis, and the consequence is that it affects the City up to a later hour than 12.

309. In your judgment, do the public suffer from the want of such a regulation as that proposed in clause 10?

I think so, from my own observation, and I go to and from the City almost every day of my life. I see constant stoppages to the traffic from omnibuses not pullining to the side of the road; they pull up one in front of another, and not only occasion a stoppage to the traffic, but cause danger and inconvenience to the passengers themselves. They are not allowed to stop at a crossing, and they pull up in the middle of a dirty road, and the unfortunate passenger has to get out and struggle through the mud to either one side or the other, and at the risk of being injured by the vehicles behind.

310. Lord *Stanley of Alderley.*] Do you not think that obliging the omnibuses to go out of their line, and compelling them to go to the footpath, might to some extent interfere with the traffic more than at present?

I think not; they should properly keep as near the kerbstone as may be, but they never do so as a rule; and the reason of that in the narrow streets to a great extent is this, that when vehicles are standing a heavy vehicle in motion tries to keep at a sufficient distance from the kerbstone to pass those vehicles, because the stream of traffic in the main streets of the City especially is so continuous that if a vehicle is once forced in behind another, which is standing still, it is shut out altogether. But I think that that clause is more applicable to the broad streets outside the City than to the City itself. The omnibuses are almost compelled, from the narrowness of the streets in the City, to keep close to the kerbstone when there is no vehicle in the way; but in Oxford-street, for example, and those wide streets, such as the upper part of Holborn, I constantly see omnibuses pulling up, and obliging passengers to cross a muddy street a considerable way, sometimes at the risk of their lives; whereas if they were obliged to pull in close to the pavement, the passengers could go on to the pavement, and cross, if they desired to cross, at the next crossing.

311. *Chairman.*] Would not the probable effect of this clause becoming law be, that the omnibuses would naturally, for their own convenience, take a line nearer to the pavement than they do at present?

I think so, and it would enable one omnibus to pass another, which, as a rule, the one in front tries to prevent the other from doing, by pulling up immediately in front of it; which they call "nursing," and they block the traffic all the way along.

312. Does the present practice of carrying placards, and distributing advertisements in the streets, interrupt the free passage of the footways, and occasion inconvenience and annoyance to the public?

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Yes; it does both. In the first place it obstructs the passage of the footways, especially in the City, and for this reason, that the streets are so narrow, and the roadway is so completely occupied by carriages, that these men with books and placards cannot, as they do to a certain extent in the other parts of the metropolis, keep in the gutter and by the side of the foot-pavement; they are obliged constantly to get upon the foot-pavement for their own safety, and the result of that is that they obstruct everybody who is on the crowded and narrow footway. In addition to that these fellows, who distribute notices, as they are called, under the shape of advertisements, frequently distribute most indecent productions; there are advertisements for objectionable exhibitions, and so on, and they are likewise the cause of actual obstruction. A fellow stands in the middle of a very narrow roadway, and pushes these things into your hand at every opportunity. I have had a great many complaints from people who have been annoyed and disgusted by having these things thrust into their hands; they have sent them to me, and have asked whether the police could do nothing to prevent it.

313. Is there any law in the City, such as Sir Richard Mayne told us there was in the Metropolitan district, to prevent those placards from being carried on the foot pavement?

It is simply under the Police Act, which prohibits obstructions; you summon a man when he is creating an obstruction, but there is no special law to prevent these things from being carried.

314. Lord *Stanley of Alderley.*] I think that there is a special clause in the Police Act which enables the police to prevent advertising vans?

That is on the roadway.

315. Does that apply to the City as well as to the Metropolitan district?

No, it is a special Act; it is not in the City Police Act.

316. *Chairman.*] I think that within the Metropolitan area the law absolutely prohibits placards from being carried on the foot pavement, which is the reason of their being carried in the gutter; but they are only prevented from being carried in the roadway when somebody comes forward to give evidence of the annoyance?

Yes.

317. But that is not the case in the City?

There is no law in the City beyond this, that if persons create an obstruction you can remove them; and if they refuse to get out of the way, they can be taken into custody.

318. Has your attention been called to the clauses of the Bill, which propose to make special limits within the City?

Those are clauses 12 and 13. I have considered them attentively.

319. Are you of opinion that the method by which it is proposed to effect the object sought to be attained by these clauses, is the best which could be adopted?

No; I must say that I do not think that it is, and for this reason, that the whole of the City is within what are called the general limits of the Bill; and the consequence of that is, that it would render it necessary to include within the special limits many streets, almost every street, in fact, which enters the City from the Metropolitan district. It seems to me, therefore, that the proper principle to adopt in making rules which are to apply to a street, part of which is within one district and part within the other, would be that they should be made if possible by the same authority; but if that were not practicable, I think that the next best plan would be that they should be made at all events by two persons, or two authorities, who are responsible to the same authority, so as to prevent any conflict of opinion between the City and the Metropolitan authorities in the case of a street which is partly within and partly without the City, and to which the same regulations must necessarily apply if they are to be useful.

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320. Then, I understand your objection to be this, that in the case of the Metropolitan district the regulations are to be made by the Commissioner of Police and the Secretary of State; and in the case of the City, there is to be a third party intervening whose consent is necessary?

That is so.

321. *Lord Stanley of Alderley.*] You think that it is better not to require the consent of the Lord Mayor and Aldermen, but to leave it to the two respective Commissioners of Police, with the sanction of the Secretary of State?

I think so, and that was the opinion and the recommendation of a Select Committee of the House of Commons, which sat last year, and reported that it should be so.

322. *Chairman.*] To what extent is the Commissioner of City Police under the authority of the Secretary of State?

Almost as much so, I think, as the Commissioner of the Metropolitan Police. He is removable by the Crown; his appointment is confirmed by the Queen; the rules which he makes for the government of the police force are submitted to the Secretary of State for his approval; he cannot be absent from his duties without the sanction of the Secretary of State; and he can be required, under one of the clauses of the City Police Act, to report directly to the Secretary of State upon certain matters, so that he is practically almost as much responsible to the Secretary of State as the Metropolitan Commissioner of Police, although he is also to some extent responsible to the Court of Aldermen; at least, he is removable by the Court of Aldermen as well as by the Crown.

323. Have you any further reasons for apprehending that the interference of the Court of Mayor and Aldermen would be prejudicial to the working of the Act?

I think that it would act prejudicially in this way, that it must tend to delay the operation of any rules which might originate with the Commissioner of Police. I think that, in order to make this clause effective, it would be necessary that the two Commissioners of Police, in many instances, should decide together upon what rules and regulations should be made relating to the same street.

324. Will you name a street as an example?

I will take, for instance, Chancery-lane, or the Strand at Temple Bar. The two Commissioners of Police having decided upon what it would be necessary to do, the Commissioner of the Metropolitan Police would immediately submit his regulations to the Secretary of State for approval, whereas the City Commissioner of Police would have to obtain the consent of the Court of Mayor and Aldermen before he could submit his regulations to the Secretary of State; and there are many circumstances which I think, from the manner in which the proceedings of the Court of Aldermen are necessarily conducted, must tend to delay the action that would otherwise be taken simultaneously by the two Commissioners in making rules which were to apply to the same street.

325. What are the chief causes of the present obstruction to the street traffic?

The principal cause is that the streets are too narrow for the enormous amount of traffic which is constantly forced through them; but the next cause of obstruction is the practice, in the main thoroughfares especially and the busy streets, of vehicles standing to load and unload for an unreasonable time. Vehicles come there—railway vans and large vehicles of all kinds, and they practically block a street sometimes for an hour or two together; and many of the main thoroughfares of the City, such, for example, as the end of Fenchurch-street, Queen-street, and Threadneedle-street, are streets which are scarcely more than 14 or 15 feet wide. The consequence is, that when any vehicle pulls up in one of these streets to load or unload, one line of traffic is entirely stopped, unless there is a policeman at hand to regulate it alternately, and to allow four or five vehicles to pass one way, and four or five the other. Drivers are quarrelling, and confusion is created directly; and that is why I think that paragraph 2, in clause 13, is so very essential, namely, "With respect to the period of days and times during which carts, carriages, or other vehicles may be allowed to come into or remain in any street for the purpose of loading or unloading." That, I think, will prove to be the most useful clause in the whole Bill, if it be efficiently carried out.

326. Do you think that if efficient regulations were made under these clauses, it would remove some of the present causes of obstruction?
I am quite sure that it would.

327. Lord *Stanley of Alderley*.] Do you think that the continual plying of cabs for fares interferes much with the traffic?
It does so tremendously in the City, and it is very difficult to deal with that matter. There is no room in the City for cab-stands; there are, I think, 40 cab-stands in the City, and accommodation for about 260 or 270 cabs, and there is scarcely a day, I fancy, in which there are not at least 1,000 cabs in the City; on a wet day there are a great many more. These cabs come in in the morning with their fares, and they immediately turn round and crawl about; they cannot get to the stands, which are filled as a matter of course, that is to say, the stands in the busy thoroughfares, and so they crawl about the streets. Between three and four o'clock I have myself counted as many as 100 empty cabs coming in one direction from Temple Bar towards the Bank; and you can hardly touch them, for this reason, that it is not an offence against the law unless they are plying for hire; unless the drivers make a signal to somebody they cannot be convicted of plying for hire otherwise than at their regularly appointed standing; but they can do that very well without holding up their finger. Indeed many people think them so convenient that there is a great objection to enforce the law when the drivers are proceeded against. I have been told myself by a magistrate of the City that it is of very little use sending them before him, for that he has found them so convenient he could not find it in his conscience to fine or punish them.

328. Upon the whole, are you of opinion that it would be productive of more inconvenience to stop them, than to allow them to go as they do at present?
No; I think that it would be more convenient if a certain number of them were stopped; because these cabs come in for the convenience of a certain class, and the less numerous class. No doubt, as regards the convenience of the general public and the general traffic, some regulation as to these empty cabs would be very desirable.

329. Earl *Granville*.] Even if it were desirable, how would it be possible to carry it out; a cabman comes into the middle of the City with his fare and walks back again?
I would not let them turn round. Take, for instance, Cheapside; these drivers put down a fare at the Bank and crawl along Cheapside; they turn and come back again, and they are the cause of a constant obstruction in this way; a cab is coming on its near side down the street, and a passenger looking for a cab on the footway meets it, he makes a signal to the driver, and the cab stops, and has to cross both lines of traffic in order to turn and get into the line on the opposite side of the street. If people would only take the trouble to cross the street, so as to have the cab-horse's head in the direction in which they wished to go, it would not be so objectionable; but anybody wanting a cab gets into it where it is most convenient to himself, and the consequence is, that anybody who takes one of these crawling cabs coming in the contrary direction to that in which he is himself going, stops the traffic, more or less, to suit his own convenience.

330. Lord *Stanley of Alderley*.] Would it not be possible to provide a greater number of cab-stands in the streets adjacent to the great thoroughfares?
Not in the City; that has been tried; every available place is now occupied. The cabmen too have an objection to going to stands unless they are in busy thoroughfares.

331. I suppose that there would be no difficulty in forcing a cabman to go to the nearest stand?
No, but there is no chance of their getting on to a stand, there being no room for them. At some of the stands in the City, for instance, the one close to the Bank, where there is standing-room for five or six cabs, a man is regularly employed,

employed, with a whistle; and the moment a cab leaves the stand this man gives a loud whistle, and there is a rush of a number of cabs to try and get upon the stand.

332. Do you think it desirable to introduce any regulation to prevent these cabs crawling about?

I think that the first paragraph under clause 13 would do it, namely, "With respect to the route to be taken by all carts, carriages, or other vehicles passing along the streets, with power to prohibit any cart, carriage, or other vehicle from coming into any street or part of a street, for the purpose only of passing to its destination in some other street or part of a street." I think, for example, that if empty cabs were coming to Temple Bar, the drivers might be asked where they were going to; and the answer would probably be, "To the nearest standing." The nearest standing there would be at the church behind them, within 100 yards.

333. *Chairman.*] Have you any suggestions to make with reference to the remaining clauses of the Bill?

With regard to hackney carriages, the first paragraph of clause 17 provides, that "No fare less than the sum of 1 *s.* shall be payable to the driver of any hackney carriage drawn by one horse, and where, previously to the passing of this Act, less than that sum would have been payable, 1 *s.* shall henceforth be paid." I am not at all sure that that provision will be appreciated either by the cabmen or by the public. My own impression is that it will act injuriously to the cabmen, and that people will not be disposed to take cabs so readily as they do now. It is a very difficult matter to deal with, but it has occurred to me that it would be almost better to have, as they have on railways and in steamers, two classes of fares, some cabs might be licensed to charge a higher rate per mile, say 9 *d.*, and the others 6 *d.* per mile as now, and they should be distinguished in some way; all the first-class cabs might be required to be painted of one colour, so that anybody would know, by a cab being of a particular colour, that it was a cab for which he must pay 9 *d.* a mile; and I think that the cabs should be inspected periodically. I suppose that there would be an inspector for each district. There must be some arrangement under such a clause, that a cabman should be required to attend once a month at least, so that it might be seen that the cab was in proper order, to satisfy the inspector.

334. Lord *Stanley of Alderley.*] Have you seen the clause which Lord Belmore proposes to introduce into this Bill?

I saw it yesterday.

335. Do you think that that is calculated to meet your object?

That is something similar in effect to what I propose, except that I think the first class cabs might be made to be more easily recognisable by having them of a particular colour. I do not know that it would be objectionable. If all the better cabs were required to be painted of a particular colour, everybody would know them.

336. In your opinion it is questionable whether it would be advantageous either for the public, or for the cab-owners themselves, to have the minimum fare raised from 6 *d.* to 1 *s.*?

I think so.

337. *Chairman.*] Do you know what is the view of the cab-owners upon the subject?

No.

338. You would not be surprised to hear that they told me that they had no objection to the 1 *s.*?

As a rule I think that the 1 *s.* is given now.

339. Lord *Stanley of Alderley.*] In what way do you think that it would operate injuriously to the cab-owners?

I think that people would not take cabs so readily as they do now. I think that it is the cheapness of the fare which has been the cause of so many cabs being licensed. Your Lordships heard from Sir Richard Mayne yesterday that the number of cabs has doubled within a very short period.

340. Do you think that there are a large proportion of cabs which receive 6 *d.*?

I think that a large number of the four-wheel cabs receive 6 *d.*

341. Lord *Methuen.*] Will not the cab-owners require more from their cabmen, if the 1 *s.* is obliged to be received?

I think that that is very possible.

342. Lord *Stanley of Alderley.*] Have you had any communication with any of the people connected with cabs, which leads you to be of opinion that they would be likely to adopt the proposition for a higher class of fare?

No; but I think that it would answer. They are now introducing omnibuses which carry passengers at different fares.

343. What better accommodation is given?

The inside of the omnibus used by first-class passengers is better stuffed, and is more comfortable in every way. There are large omnibuses now going to the Metropolitan Railway which are divided into first and second class compartments; they seem to answer, and I do not see why the same principle should not be applied to cabs; if there was a proper inspection of them, and if that inspection was constant, so as to secure that the cab for which you were obliged to pay 9 *d.* a mile was sufficiently clean and comfortable for the additional price, I do not think that the public would be better satisfied.

344. Lord *Houghton.*] Would you propose that that high tariff should be fixed, or would you leave it optional?

I think that it should be fixed.

345. What do you think would be the consequence of not having a fixed tariff?

I think that it would lead to disputes with the people who fancied that they were overcharged; and it would be difficult to stop a cabman in the street, and to make a bargain with him as to what he should carry you for; when once he got you into his cab, I think that you would be at his mercy.

346. Would not that be prevented by placing in some very prominent position in the cab the fare at which he agreed to go?

That would, practically, amount to a fixed scale of fares. I do not quite see what your Lordship proposes.

347. What I mean by a fixed rate of fares, is a rate of fares fixed by Act of Parliament?

That is what I mean.

348. The rate may either be fixed by Act of Parliament, or it may be sufficient to have it placed upon a prominent part of the cab?

Yes; but your Lordship does not propose that the man shall charge anything which he pleases, and shall make a bargain with his fare as to what the price shall be for carrying a person from one place to another, but that there shall be a fixed rate put up in the cab, and fixed upon by Act of Parliament, so that there shall not be free trade in cabs.

349. Do you think that the fare of the better carriages should be fixed in the precise way in which the fare of the lower carriages is fixed, or do you think that it would be sufficient for that fare to be placed in some prominent part of the cab?

I think that it should be positively fixed as a law.

350. Earl *Granville.*] What is your objection to there being different classes of cabs, with different rates of fare fixed at certain periods by the proprietors of those cabs, and registered at the police office, those different tickets being in some very conspicuous manner attached outside and inside the cabs. You have suggested that there should be a different sort of cab at 9 *d.* a mile; why should there not be a third class, say at 1 *s.* a mile, or 1 *s.* 6 *d.* a mile, supposing that the proprietor of the carriage thought that he could tempt the public to give that superior price?

I see

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I see no reason at all why there should not be a third class. I think that if there were a third class, it would probably be better that they should be restricted to being hired by the hour, rather than by distance. You might have a superior class of cabs, somewhat similar to the carriages which you have now upon hire at railway stations—cabs which you might hire by the hour; and a second class I think you might have at so much a mile, fixed higher than the third class. Of course it would be optional for the driver and the fare to make any private arrangement which they pleased, as is the case now.

351. Do you not think that you would arrive at the maximum of profit to the cabman, and of comfort to the passenger, if it was left a little to be worked out by the interest of the proprietor, who would gradually ascertain whether persons would pay by the mile at a higher rate, so that the thing should be fixed for a long period, and that the cab-owners should not take advantage of, say, the Derby-day, or some extraordinary thing, to charge extra fares?
And that they should be licensed to charge that fare.

352. And that they should be licensed to charge that fare, two things being required, namely, the registration at the police office of what their fare was, and that that fare should be in the most conspicuous manner possible affixed inside or outside of the carriage, or marked by the colour of the vehicle, or in any other manner which the police authorities thought best?
I do not see any great objection to that; that is practically what is now done by omnibus proprietors; they vary their fares at present; and a great many of them reduce their fares down to a penny for a certain distance. The only objection which I see to that is, that if they were constantly varying their fares at their own pleasure in this way, I think that the outside public, people who do not live in London, would be taken in. I think that the Londoners would very soon become acquainted with their tricks; but the people coming from the country would be in a difficulty, not knowing what the fare was, unless it was fixed by law.

353. Lord *Stanley of Alderley.*] Do you think that it is important that cabs should be required to have a lamp?
I do not think it important in the centre of London, but in the outskirts of London it may be. A suggestion was made to me yesterday which I think is not a bad one, namely, that the number of the cab should be upon the lamp, so that you might see it at night at all events.

354. In your experience, have you ever found any inconvenience or injury to arise from the absence of a light?
Not in the case of cabs; other vehicles which I think are much more dangerous are without lamps. Just now it is a difficult matter to take a cabman's number, at night particularly, and it is at night frequently that you require to take it, so that if the number of the cab was upon the lamp it would be an advantage.

355. If any accident happens from being run over by a cab, there is very great difficulty in taking its number?
I fancy that that difficulty is much greater outside the City than within it; the police within the City are so much more numerous in proportion to the area of the City than they are elsewhere, and the difficulty of getting through the streets is so much greater, that a cabman very rarely indeed runs over anybody, or into anything without being stopped and caught.

356. It perhaps applies more to butchers' carts, and small carts, which go very rapidly through the streets. Do you think that it would be desirable to adopt any measure enabling them to be stopped more easily, such as having a figure or a letter at the back of a board?
I think it very desirable where they are able to get along at the pace at which they do outside the City, but in the City there is no difficulty of that kind; the difficulty there is to enable vehicles to move at all, whereas outside the City the difficulty is generally to prevent their going too fast.

357. *Chairman.*] Are there any other clauses upon which you wish to make any observations?

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Clause 22, which relates to betting in the streets, is a very necessary one; in the City especially, it is very necessary to have some such clause.

358. Lord *Stanley of Alderley.*] Where are the places at which betting is carried on in the City?

There are two or three such places; there is one place at the bottom of Snow-hill, a yard, and there is a street which has been made by the London, Chatham, and Dover Railway Company, a short street which runs from Farringdon-street right across to the Fleet Prison. These fellows assemble sometimes to the number of 600 or 700, with regular betting lists, and anybody can go in and invest his money upon any race he pleases. There is no way of getting at those men except by indictment at the sessions, which is a long and difficult process. The Betting House Act only applies to houses, not streets, and it merely touches the people who keep a betting house, and not the people who bet.

359. Earl *Stanhope.*] At what hours do these meetings generally take place?

At all hours of the day, before the great races. On any day when you go into the City you may see these fellows in any number, and their presence is a great source of complaint.

360. Lord *Stanley of Alderley.*] The police have not much to do with the removal of snow, have they?

If these clauses were carried, that would have to be done by the Commissioners of Sewers, as the street authority within the City. That is a very difficult question to deal with satisfactorily.

361. There is a clause in the Bill as to dogs; what is your opinion of that clause?

I confess that I hardly see how the 19th clause, with regard to dogs, could be carried out. I scarcely understand how places could be obtained in which to confine these dogs; I should think that they would be a dreadful nuisance to the neighbourhood, and that there would be petitions against places being used for that purpose. Every dog would be required to be confined for three days at the least, except an owner was found for it; and there would be a constant succession of dogs coming in. The law at present only applies to dogs which are mad, or which are reasonably supposed to be mad. As to dogs which have no owner, or no apparent owner, I imagine that it is customary, to some extent, to look upon a good many of these dogs as if they were mad, or showed symptoms of madness, in the very hot weather, and that they are got rid of in that way. I think that this provision would be useful in the case of a person who had lost a valuable dog, as he would know where to look for it; although I fancy that now a person can almost always recover a valuable dog.

362. Are there now many loose dogs running about the streets, without marks upon them?

Yes, hundreds.

363. *Chairman.*] And do they bite children?

Yes, and they lie about the bridges; London Bridge, last year, was infested by them. They are half-starved creatures, and have no master.

364. Lord *Ebury.*] Can they get any water to drink?

The Drinking Fountain Association provides places for dogs to drink at; there are a few of them; I do not think that there are many.

365. Lord *Stanley of Alderley.*] You think it very desirable that such powers as these should be given to the police?

Yes. The question is whether, if the dogs are to be got rid of, certain powers should not be given.

366. *Chairman.*] Your objection is to keeping them for three days?

I think that that is a great objection.

367. Lord *Methuen.*] By this clause you are obliged to keep any dog, whether valuable or not, for three days?

Yes; nine-tenths of these dogs have no owner, and are not worth keeping.

368. Earl *De Grey.*] If you were to take them all in for three days, it would occasion a considerable expense?

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Yes; you must have persons to feed and look after these dogs, which are to be knocked on the head the next day.

369. *Lord Steward.*] Would it not be desirable and practicable to require every owner to have his name upon the collar of the dog, and that every dog which had not an owner's name on it should be destroyed?

That would be a far simpler way of doing it. I think that the proposed regulations with regard to dogs are rather complicated; for one valuable dog which would be found and taken care of under this clause, I should think that a hundred homeless dogs and useless brutes would have to be taken in.

370. Lord *Stanley of Alderley.*] Still, if an old lady's favourite dog strayed away and was killed, she would make a great fuss about it?

She ought to have a collar upon it.

371. *Chairman.*] That would be a protection to the dog?

It would be the best protection to the dog; the name and address should be upon the collar.

372. Earl *Granville.*] Then do you suggest adding to the words "not under the control of any person," "and without a collar"?

I think that that would meet the object. Any dog found without a collar with the owner's name and address on, I think it might be left to the police to dispose of summarily or not. If a dog is really a valuable looking dog, I think that the police now invariably take charge of it, and endeavour to find the owner for their own sakes; but I can see no objection at all to a person who has a valuable dog being required to have a collar with his name and address upon it, and that would relieve us from a great deal of difficulty which I foresee under this clause. I think that if the clause was passed as it now stands places would have to be hired in every part of London; it would be very expensive, and you would have to provide people to feed and keep these dogs for three days, it would perhaps lead to charges being made for food for them which, as they would be condemned to death, the poor brutes would not get; I think that it would be much better to knock these worthless animals upon the head at once.

373. Earl of *Kimberley.*] If you applied the provision which you suggest, you do not think that this clause would be objectionable?

No, if the owner's name and address were required to be put, and I think that then a list of such dogs found might be printed and posted at the police stations.

374. Lord *Houghton.*] Would there be any harm in putting in "one clear day."

The question is, where is the dog to be kept? I fancy that in every police division it would be almost necessary to have a kennel for these dogs, because I do not see quite what a policeman is to do otherwise with a dog which he finds in the streets.

375. There must be some place to kill a dog in?

When a dog is taken now he is generally killed at the police station.

376. Lord *Stanley of Alderley.*] After one or two raids do you think that many dogs would remain?

It is astonishing how they increase. I think that one or two raids have been made upon them, and they multiply in the most extraordinary way. It is a very odd thing that they will follow the policemen round upon their beats; there is scarcely a beat where one of these dogs without any owner does not, almost as a rule, follow the policeman round his beat; they will attach themselves to anybody in the hope of being fed.

377. Earl *De Grey.*] Do you think that an Act of this description would entail much additional labour upon your force or your office?

I do not think that it would entail much additional labour upon the constables; it would entail a great deal of additional responsibility upon the Commissioners of Police, and would throw a great deal of what would be invidious upon them, and render them unpopular, if they made stringent rules. It is for that reason that I am of opinion that if specific rules were confined to special limits, as regards both districts, those rules should, if possible, be made by the Secretary of State.

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378. But you do not think that there would be much additional work?

With regard to the City I do not think that it would be much greater than at present; the arrangements with regard to cabs we have nothing to do with.

379. Lord *Stanley of Alderley.*] Would it not require a special officer who would take the whole business of the traffic regulation under him?

The hackney carriages are all under the Commissioner of the Metropolitan Police. In the City, at this moment, there are, I think, always very nearly 100 men specially employed in regulating traffic, and occasionally a great many more; you may notice that at all the intersections of streets in the City, there are three or four policemen regulating the traffic, and that is done without any authority of the law, but if they were removed for an hour I believe that nobody would get out of the City again until they were replaced.

380. It need not involve any considerable addition of expense to carry this Act into operation?

Not, I think, so far as the City is concerned.

381. Earl of *Kimberley.*] I suppose that in one sense, by giving you greater power, it would rather facilitate the traffic than cause obstruction?

Yes; if power was given to the Commissioner of Police to do it without any interference; but I am afraid that if that clause is left we shall not have very effective or efficient traffic rules within the City, unless the Commissioners of Police are enabled to consult together, and to carry out their regulations before they go to the Secretary of State. I would venture to suggest that an Act which is now in operation in the metropolitan district, and which does not apply to the City, should be extended to the City; I believe that it is called "Mr. Bass's Act;" it is an Act for the better regulation of street music within the metropolitan district.

382. Earl *Stanhope.*] What is the date of that Act?

The 25th of July 1864, but it does not include the City; and the consequence is, that people are annoyed by street musicians. We cannot deal summarily with them, as they are dealt with in the Metropolitan Police District. It would simply be a short clause, to extend the provisions of that Act to the City of London; it is an Act of three clauses. That Act has produced a good effect; these fellows now know that they can be compelled to leave.

383. *Chairman.*] Are there any other observations which you wish to make?

There is no provision under this Bill such as was proposed in the Bill which the City promoted, for giving the Commissioner of Police power to license or to protect a very useful class of people, namely, the Commissionaires and the shoeblacks who belong to recognised societies. There was a clause in the City Police Bill to this effect: "It shall be lawful for the Commissioner of Police, from time to time, and as occasion shall require, to license street shoeblacks and Commissionaires or messengers to exercise their calling in the metropolis, and to appoint places at which they may stand to exercise their respective callings, and to direct the numbers of each class who may stand at the appointed places." And then there was a clause imposing penalties upon people who molested them and fraudulently put on or imitated their dress. In the City, at this moment, there are many loose characters and others who frequent the streets and impose upon the public to a very great extent.

384. Lord *Houghton.*] Those men have only one arm?

Some of them have only one arm; but there is a corps of old soldiers, the Commissionaires, who are employed largely by the public; and there are shoeblacks of various societies who are looked after and cared for, and whom the police now have no power to protect or license in any way. I think that it would be very advantageous to the public, and also to a number of boys who are endeavouring to get an honest livelihood, if there was some provision in this Bill giving power to the Commissioner of Police to license them, and to appoint places where they might stand without interfering with the traffic. For example, a number of men who have been dismissed from the Corps of Commissionaires for misconduct, immediately set up on their own account, and impose upon the public, and the shoeblack boys are molested by a set of little vagabonds who will not enrol themselves in these societies, simply because they will then be under some control. There are also a number of fellows in the City who represent themselves as messengers, and hang about the streets, and get hold, perhaps, of a lady's bag under the pretext of carrying it, and run away with it; I think that if men were licensed by the Commissioner of Police, it would be beneficial to the public, and would be a very good thing for the men themselves. The clause which I have read was a clause that was introduced into a Bill which the City of London promoted last year, which was to apply only to the City; the Select Committee did not go into the Bill, and recommended that it should be withdrawn, and that a Bill should be introduced by the Government applying to the Metropolis and to the City also. This Bill is the result of that recommendation, but there is no clause in this Bill of a similar character to that which I have read, and I cannot see that there would be anything objectionable in it; I think that it would be advantageous to the public, and advantageous to the parties themselves.

385. *Lord Steward.*] How would you make it work; would you make it unlawful for any one else to ply the avocation, except those persons who were licensed by the police?

I would; take, for instance, the case of shoeblacks; what is done in the Metropolitan District, and what is done in the City at this moment, is this: the Commissioners of Police allow them to stand in certain places where it is convenient to the public, and where they do not obstruct the traffic; that is to say, the police do not molest or interfere with them; they are there, but the police have no power at all to prevent a number of other boys assembling at those places, and interfering with those shoeblacks.

386. Lord *Stanley of Alderley.*] Then you would create a monopoly?

I would not create a monopoly with regard to any particular society; I think that there should be perfect free trade in that respect, but I think that boys who ply their trade in that way should be under some control.

387. Do the ex-Commissionaires to whom you have alluded retain their clothes?

No; but they get up a dress as closely imitating the other as they possibly can.

388. *Lord Steward.*] Would it be possible to prevent these men from plying their calling?

Yes; the men would be licensed.

389. I understand that you propose to license a certain number of persons, and to allow them to stand in a particular place where they might be conveniently at call; but do you propose to prevent anybody else who chooses to dress himself up in some similar dress from walking about the streets, or from being ready to be employed?

Not from walking about the streets, but from standing at these places. I would have places regularly appointed at which men should be found, something like cab stands, for example; and I would not allow anybody but the man so licensed to stand at these places.

390. Lord *Methuen.*] Do you not think that it is for the benefit of the public that only licensed men should undertake that occupation of carrying parcels?

Quite so. I believe that there are several men who have been dismissed from the Corps of Commissionaires who have been convicted of felony, and who are wearing a dress closely imitating the dress of the Commissionaires, and who are imposing upon the public; they imitate the dress as nearly as they possibly can; in fact, I believe that some go so closely to it as to imitate the dress exactly, with the exception of having one C. instead of two C.'s upon the collar. The double C., I believe, means the Corps of Commissionaires; it is a fraudulent imitation, no doubt, and it is done with the object of imposing upon the public.

391. Lord *Stanley of Alderley.*] There would be no means of dealing with this

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this matter except by requiring a license, and prohibiting any other persons from acting in this way?

I would confine it to these places which were specially appointed, and it is only to such places that these fellows go; they hang about them knowing that they are the spots where the public most readily look for men to employ.

392. *Lord Steward.*] Your clause would not propose to interfere with those men who were unlicensed, except at those places where the licensed men were allowed to assemble?

No, unless they obstructed the streets. We could not interfere with them; no law could prevent a man giving a bag to another to carry, and paying him for carrying it; but the very fact of these men being licensed would be a security to the public.

393. Lord *Methuen.*] I apprehend that at the present moment you have the power of telling such men to move on?

No; practically there is no power at all. You may tell a man to move on, and he moves two feet out of your way and ceases to be an obstruction, and moves back again the moment you are gone. The following is the clause which was proposed in the City Bill, and I should propose that something of the same sort should be inserted in the present Bill:—"Every shoeblack and commissionaire, or messenger, other than those authorised by the Commissioner of Police, who shall occupy the standings appointed by the said Commissioner, or who shall remain there after being required by a constable on duty to leave; and every person other than those requiring and using the services of a shoeblack or commissionaire, or messenger, assembling or remaining at the standings, or in the immediate proximity thereof, after being requested by the constable on duty to leave; and every person or persons molesting or obstructing any authorised shoeblack, commissionaire, or messenger, in the exercise of his calling, and every person not being an authorised shoeblack or commissionaire who shall fraudulently put on or imitate the dress or take the name, designation, or character of any authorised shoeblack or commissionaire."

394. *Chairman.*] Have you any further observations to make?
No.

The Witness is directed to withdraw.

MR. ROBERT HANBURY, is called in; and Examined, as follows:

Mr. *R. Hanbury.*

395. *Chairman.*] I THINK you have been 53 years in the brewing trade, and are thoroughly conversant with the establishment of Messrs. Truman, Hanbury, Buxton, & Co., and also are competent to speak of the general circumstances of that trade in the Metropolis?
Yes.

396. Will you state the general feeling of the trade with reference to Clause 6 of this Bill?

I think it would be quite impossible for us to continue our business if that clause were passed, because we are now allowed the whole day, from five o'clock in the morning to do our business, and by this Act we should only have nine hours to do it, and practically it would be reduced to four or five hours, because our customers would not be disposed to get up so early as one o'clock in the morning to receive their goods; they would order us to send the beer in at perhaps five or six o'clock in the morning, and everything must be done by nine o'clock. I will show the effect on one day's work. We send out in one day 3,000 barrels of beer, and we employ about 190 horses and 100 men. If that work had to be done in four or five hours, the horses must be multiplied by four and the men by two. After nine o'clock in the morning the men would have nothing to do throughout the day, and day would be turned into night; between 300 and 400 men would be taken away entirely from their own homes all the night long.

397. Earl *Granville.*] How long is the day's work now for the horses?

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In the summer we begin about four o'clock, and have not done till 11 or 12 o'clock at night.

398. I mean, what is the day's work for the same horses and the same men?
They generally go out three times a day; it depends upon the distance they have to go; if they had to go into the country they would only be able to do one job in the day, but in London they generally average about three times a day.

399. Can you state the average number of hours a day that the same horses and the same men are out?
I should say, certainly, 12 hours.

400. Earl *Stanhope.*] Is that only in the summer, or in the winter also?
It is more in the summer than in the winter.

401. Earl *Granville.*] Are the same horses out for 12 hours every day in the week?
Yes; in the middle of the day you never see a horse in the stable, except he is lame.

402. Lord *Ebury.*] Of course they are standing about a good deal of that time?
Yes, they feed in the streets; indeed they have all their food in the streets.

403. Earl of *Kimberley.*] Their work, in fact, is very much like that of farm horses, and they are treated very much in the same manner?
Yes; but farm horses, I am told, have rest in the course of the day.

404. Lord *Stanley of Alderley.*] Would the provisions of this Bill interfere with your business in any other respect, except that you do not think you would have time to get through the work that you have to do in the day?
It would be impracticable to execute the orders that we have in so short a time.

405. You think that you could not do it without doubling your establishment?
I think it is only reasonable to suppose that the men would not do half so much in one hour of the night as they would do in the light.

406. You think that having to do the work in the night, would be very inconvenient?
Very inconvenient, and the public houses must be open. Now, the law says, that the public houses shall not be opened longer than a certain time. A publican would have to get up and open his house to receive the beer or the wine, or the coals, or whatever he might have in for the use of his house.

407. Earl *Stanhope.*] We have had evidence before us that there prevails in the City some such limitation by custom as it is now sought to establish by law; are you cognisant of such a usage?
Yes; we know that we cannot deliver beer in the City or in the Borough after nine in the morning.

408. As you do not find that custom prohibitive to your business, why should a similar custom beyond the limits of the City be so?
The City is so small a part of London. Taking a radius of four miles from Charing Cross, I think that in that radius there are 9,500 public houses.

409. Do you strictly conform to that custom within the limits of the City?
We always supply our publicans in the City first in the morning. We always send the first turn out in the morning into the City, so as to comply with the regulations, but we could not do that all over London.

410. Lord *Stanley of Alderley.*] Do you deliver your beer in the course of the night in the City and the Borough?

After five in the evening and before nine in the morning. We can deliver beer twice in the day.

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411. Earl *De Grey.*] What is the earliest hour in the morning at which you begin to deliver?
Not before five at present.

412. In winter as well as summer?
Yes; sometimes in winter.

413. Lord *Stanley of Alderley.*] I understand you to say that you are able to carry on your business now under those regulations, so long as they are confined to a limited space like the City and the Borough. Do you think that you would be able to conduct your business, if, instead of this Bill being of universal application, the limitation preventing you from delivering your beer, except within the prescribed hours, were confined to the main thoroughfares, while the rest of the metropolis was left in the condition in which it is at present.
I think that there might be an arrangement of that kind, but I do not think that the framers of this Bill can have considered the districts out of London, such as Hackney, Camberwell, Clapham, and Kensington, where there can be no obstruction caused by our delivering beer at any time of the day.

414. To meet that case it might be sufficient to limit the area within which the Bill should have operation: supposing that the suburban part of the town were not included in the Bill, that would relieve you from all difficulty with regard to deliveries in that part of the metropolis.
Yes; but there would be great difficulty in our doing more in the prescribed hours than now.

415. *Chairman.*] Supposing a radius were taken, of which Hyde Park Corner were the outside, and Charing Cross or Temple Bar the centre, and the hours was extended from 10 to 11, do you think that you would be able to carry on your business then?
I think it would be far better than the Act as proposed, but still there would be great difficulty about it. I did not come here at all to plead inconvenience or expense. We should be happy, if it were possible, to conform to such a regulation.

416. *Lord Steward.*] How long in practice would a dray stand opposite a place delivering beer?
It depends very much upon the publican; some publicans will keep the draymen waiting an hour before they get up to take in the beer; they are a very independent set of people.

417. What is the greatest quantity of beer you would deliver on one occasion?
It varies very much; sometimes there will be one dray, sometimes two, and sometimes as many as six at once.

418. Supposing that the publican caused no delay on his part, how long ought a drayman to be in delivering a dray full of beer?
I should think it would take nearly an hour; he has to go into the cellar, and has to move, perhaps, many empty butts, and take those empty butts out; and the publican very often makes the drayman put his cellar in order; that would take an hour, I should think.

419. Is not it self-evident to you that of itself must cause a great obstruction in the streets while it is going on?
No doubt about it.

420. Has any mode ever suggested itself to you by which that might be obviated?
No.

421. Any mode by which the interests of the wayfaring public might be reconciled with the interests of the beer-drinking public?
I could not suggest any means to get rid of the difficulty. I think that acci-

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dents would be very much increased by our delivering beer so much in the dark.

422. Lord *Stanley of Alderley.*] Where the cellars were open in the dark, you think that people would be more likely to meet with accidents, from tumbling in?

Yes; I could mention two cases in which actions were brought against us for people falling into cellars; and Lord Chief Justice Cockburn and Lord Chief Justice Erle said that the accident arose from delivering the beer in the dark.

423. Lord *Methuen.*] The beer is delivered in the dark in the winter?

Yes, it must be.

424. Do you find accidents more frequent in the winter, owing to that?

I should think they were more frequent, certainly; in the dark people will not take that care that they would perhaps take in the light; people wandering about, perhaps half tipsy, tumble into those places.

425. Lord *Stanley of Alderley.*] Is it the practice of your firm now more than it formerly was to deliver beer in small quantities?

Very much so. It is a different system altogether now from what it was formerly. The publicans in former years used to sell a very different sort of beer. They used at that time to have in beer which was nearly 12 months old, and in large quantities; 40 or 50 butts at a time; and now they have it in perhaps twice or three times a week.

426. It is the custom now to drink newer beer than used to be drunk?

Yes.

427. Lord *Ebury.*] The taste has altered?

Yes; they drink it directly it is brewed.

428. Lord *Stanley of Alderley.*] Is the practice also becoming more common of delivering beer at private houses in small casks?

That is not so much our custom, but Ind, Coope & Co., the Romford Brewery, supply more than 600 houses every day.

429. *Lord Steward.*] In those cases the beer is taken down by hand into the cellars, is it not, and not let down by ropes?

Entirely by hand; they are small casks.

430. Lord *Stanley of Alderley.*] Are they 10-gallon casks?

Casks of 9 and 18 gallons.

431. *Chairman.*] That method of taking beer by hand from the drays to the cellars does not cause the same obstruction as letting down large casks by ropes, does it?

No.

432. Do you think it would be possible for persons in your trade to make such arrangements as that the large casks, which have to be let down by ropes in the manner described, should be delivered at an earlier hour in the morning than those smaller casks which are carried into the cellars by hand?

Then we must have the cellars open twice a day; the publican would have the large casks in the morning and the small casks in the middle of the day.

433. Would that be the cause of great inconvenience to the public?

It would cause two sendings instead of one. Publicans generally order so much porter in large casks and so much ale in small casks, and they all go together.

434. Earl *Granville.*] You say that the custom has very much changed with regard to the delivery of beer, that it is more frequent than it used to be. Though publicans are, as you say, an independent body, there is a very good understanding, I imagine, between the brewers and the publicans, and you exercise some little influence over them. If a change in the law for the general advantage were made, do not you think it would be possible in a great degree to revert to the previous practice, and to make fewer deliveries with a larger quantity of casks?

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They drink the beer so very mild now; formerly they used to like it kept six or seven months, so that it should be matured before it was sent out; now, in the summer, our beer is brewed one day and sent out the next.

435. *Chairman.*] Do you in practice, in sending a dray to a public house, send large casks and small casks upon the same dray?
Yes.

436. *Lord Steward.*] Would there be any difficulty if, instead of letting the casks down into the cellars, the beer was drawn off by means of a hose from the casks into the cellars?
It would very much injure the quality of the beer, as the process would occupy a long time.

437. Earl *De Grey.*] Do you know of any means of avoiding the necessity of turning the cart round in order to get the casks out, which is now a great source of public inconvenience?
No, I have never thought of that.

438. Lord *Ebury.*] In the City, and in that part of the Borough of Southwark which is under the jurisdiction of the City of London, I understand you to say that the deliveries are all finished at nine o'clock; could you enlarge that at all?
I think it would be possible to enlarge it, but not to any very great extent.

439. Lord *Stanley of Alderley.*] Supposing you were prohibited from delivering any beer after the hour mentioned in this Bill in any of the great thoroughfares, such as the Strand, Oxford-street, Pall Mall, and Piccadilly, as you are already prohibited from delivering it in Cheapside and Fleet-street, and other streets of the City, but that it was still left open to you to deliver it as you now do in other parts of town, do not you think that that might be managed by the trade?
I think there might be some arrangement of that sort.

440. If the margin at the outside were left to you undisturbed by the regulations, and if they were limited only to those great thoroughfares, that would diminish your objection very considerably?
No doubt; there are many streets leading out of main streets where we might deliver beer without any obstruction.

441. *Chairman.*] Has your attention been called to that part of the Bill which provides for special limits?
No, it has not particularly.

442. Following the question which was last asked you, you would not be able, I presume, to give an opinion off-hand whether, supposing that some such arrangement as was suggested were to be made, it would be better to schedule a number of streets in the Bill in which beer should not be delivered after a certain hour, or whether it would be better to have bye-laws or regulations to be made by the Secretary of State as to what streets should be included?
If any alteration is to be made in the present arrangement, I think we should know the particular streets that we are not to deliver beer in.

443. Lord *Stanley of Alderley.*] You would prefer having them scheduled in the Bill to leaving it to the discretion of the police authorities to say what particular streets should be included?
Yes; I think otherwise it would be very difficult for us to ascertain where to go to get permission.

444. Earl of *Kimberley.*] I do not think the Chairman means to suggest that the police might give those permissions from day to day, but that regulations might be published in the "Gazette," by the authority of the Secretary of State, stating what streets would under the Act be streets in which the beer could not be delivered within the prescribed hours; do you think that that would cause any inconvenience in practical working.
If we knew, and if we had printed instructions to tell us, what streets we might deliver beer in, that would lessen the inconvenience.

445. Do not you think that it might be more convenient to leave some discretion to the Commissioner of Police and the Secretary of State, rather than to put the

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the streets into a schedule in the Act, because it might be found in practice that the streets so scheduled were not the streets to which it would be convenient to apply the regulations?

Yes, I think perhaps it might be.

446. Earl *Granville.*] I think you said that you would feel some difficulty from the fact of your not knowing in what streets the delivery of beer was prohibited, and in what streets it was allowed; but would not the fact of those orders being published in the "Gazette," after having been approved by the Secretary of State, render it easy for your foreman to ascertain exactly what streets were included within the prohibition?

If the streets were named in the "Gazette," of course there would be no difficulty in our knowing what streets we might deliver in.

447. *Chairman.*] There is a provision in the Bill, not only that the order specifying the streets should be published in the "Gazette," but that notice of such order shall be "affixed to a lamp-post, or otherwise placarded in some conspicuous position in or near the street, or portion of a street, to which the said order relates"?

I think that with a little practice we should become familiar with the regulations; but still I must say that, with any modification of the Bill which might be made, I am afraid we should have very great difficulty in accommodating ourselves to it.

448. Earl *Granville.*] Do you remember when the regulation was made which prevented your unloading in the City within certain hours?

It has been in force as long I can remember?

449. You do not remember whether the change proved inconvenient at first?

No.

The Witness is directed to withdraw.

Mr. ALEXANDER FRASER and Mr. THOMAS COXON, Examined.

Mr. *A. Fraser* and Mr. *T. Coxon.*

450. *Chairman* (to Mr. *Coxon*).] Are you Manager to Messrs. Bass & Co.

Yes.

451. (To Mr. *Fraser*). Are you Manager to Messrs. Truman, Hanbury & Co.?

I am.

452. You have both been for many years engaged in the management of your respective establishments?

(Mr. *Coxon.*) I have been connected with the establishment of Messrs. Bass & Co. for 25 years.

(Mr. *Fraser.*) And I have been connected with that of Messrs. Truman, Hanbury & Co. for 29 years.

453. (To Mr. *Coxon.*) What is the extent of your business?

Our deliveries are 180,000 in London. Ours is a very different business from that of the other brewers; we supply large dealers who generally have their cellars in back streets and out-of-the-way places, though many of them are within the mile radius of Charing Cross. We, in fact, now always deliver in the crowded thoroughfares before 12 o'clock, but we deliver to the large dealers in the bye streets all day long, in large quantities. In the City most of our deliveries are in the evening, at about six or seven o'clock.

454. Will you state the objections you have to Clause 6, as it stands in he Bill?

The objection I have to it is that it is altogether unnecessary; that the clauses with regard to special limits would be quite sufficient without that clause. We should be very happy to submit to any regulations which would improve the traffic, so long as our trade is not stopped. We think, under the clause as it at present stands, there would be an end to our business. We think that it would be much more convenient to the public that we should be allowed to deliver in out-of-the-way places in the day time than in the night time. To

deliver

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deliver at night would be inconvenient to the public and dangerous to our men, and in many respects much to be deprecated. We think it injurious to our men to be employed by night instead of by day, and we maintain that they can deliver by day without inconvenience at all in those by-streets.

455. You admit that there are certain streets in the metropolis in respect of which it would be for the convenience of the public that the delivery of beer should be subject to certain restrictions?

Yes; and in fact we never deliver in Oxford-street or the Strand or in crowded thoroughfares after 10 o'clock now; our business is not nearly so much in crowded thoroughfares as in by-streets.

456. Lord *Stanley of Alderley.*] If the restriction were limited to the great thoroughfares you would have no objection to make to this Bill?

No.

457. *Lord Steward.*] You have had your attention drawn to the Special Limits Clause of this Bill?

Yes.

458. Do you think that the regulations which the Secretary of State in conjunction with the Commissioner of Police would be able to make under that Special Limits Clause would be sufficient; and that your firm would have no objection to act under those regulations?

So long as no radius is specified. We object to any radius, even half a mile from Charing Cross, because there are plenty of places within half a mile of Charing Cross where beer could be delivered all day to the convenience of ourselves, our customers, and the public.

459. Earl of *Kimberley.*] You object to absolute prohibition?

Yes.

460. Lord *Stanley of Alderley.*] You do not object to actual prohibition as far as the great thoroughfares are concerned?

Not at all.

461. Earl *De Grey.*] You wish the names of the streets to be specified by some authority?

Yes; by some authority.

462. Not necessarily in the Act of Parliament?

Speaking for myself, I have an objection to being too much under the control of the police.

463. *Lord Steward.*] The regulations are to be with the concurrence of the Secretary of State?

I think with that protection we might be safe.

464. Earl *De Grey.*] You object to any absolute prohibition in any particular area?

Yes.

465. Lord *Stanley of Alderley.*] But, as I understand you, you would much prefer having the streets, in which the delivery of beer should be prohibited within certain hours, specified in a schedule, to having it depend upon the discretion of the Commissioner of Police, even with the consent of the Secretary of State?

I have not very carefully considered that question, and I should not like to answer it off-hand. I think the streets should be specified, but I am not quite sure whether the Police Commissioner might not be the proper authority to specify them, so long as we had some protection against him, and were not entirely at his mercy. I do not think we ought to be placed at the mercy of the Commissioner of Police.

466. Does your beer, which is exported, go from the railway terminus, through the metropolis, to the docks?

No, it is all sent by canal; in fact we have stores on the Thames, and the whole of our beer which is exported is sent by lighters.

467. None of it goes through the streets?

Not any.

468. Where

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468. Where is your central depôt?
For the home trade at St. Pancras, at the Midland Railway Terminus.

469. *Lord Steward.*] Are you aware that in Clause 6, a discretion is given to the police to permit the delivery of coals or casks in such back streets or other by-ways as may be approved by the Commissioner of Police?
Yes; but, as the clause stands, it is a total prohibition with certain exceptions; we think it ought to be the reverse, and that the delivery of such things should be allowed in all streets with certain exceptions, which should be stated, so that we should be able to deliver everywhere, except in those busy thoroughfares which would be named, where obstruction would be caused to the traffic.

470. Earl *Granville.*] Would it remove your objection to this clause, if permission were given to deliver coals or casks, except in such streets and thoroughfares as were specified by the Secretary of State and the Commissioner of Police?
We should prefer to know those thoroughfares beforehand.

471. Is not there an obvious advantage in having a certain degree of elasticity in the Bill, so as to provide for the case of a street suddenly becoming a great thoroughfare, from the opening of a railway or some public building bringing a great traffic that way?
I should like the streets to be specified.

472. You object to its being left to the discretion of the police; you wish to have defined in the Act those streets in which you are to be prohibited from delivering your casks in the middle of the day?
I suppose the authority, whoever it was, would specify certain streets as being crowded streets, and we should have no power of appeal. I say we should like to know what streets it was proposed to call crowded streets.

473. Would there not be an obvious inconvenience in defining in the Act certain streets in which the delivery of casks within certain hours should be prohibited, seeing that those streets may change their character, some streets with a great deal of traffic now becoming less frequented streets, and others, which are not main thoroughfares now, becoming, from change of circumstances in the neighbourhood, such thoroughfares as absolutely to require this prohibition?
I do not contemplate that the arrangement should be final.

474. I understood you to say that you would prefer that the Act should specify those streets in which alone the prohibition should have force?
I said I had not completely made up my mind upon that point. I am rather inclined to think that perhaps it would be necessary to leave it to the Commissioner of Police and the Secretary of State to indicate the streets.

475. Lord *Stanley of Alderley.*] Would not it meet your views if the streets in which the prohibition should be in force were defined in the Act, subject to subsequent alterations which the Commissioner of Police and the Secretary of State might see fit to make?
If it were enacted that the police should only prohibit the delivery in those streets which are great thoroughfares that would be sufficient.

476. *Chairman.*] Do you apprehend, supposing such an enactment were to be introduced into the Act, any danger of the Secretary of State prohibiting the delivery of goods in streets that were not thoroughfares?
No; I think the Secretary of State's confirmation would be a great protection to us.

477. The Bill does not propose to give the Commissioner of Police power to make regulations within the special limits without the sanction of the Secretary of State; I am supposing, for the sake of argument, the clause as it stands to be taken out of the Bill, and another clause differently worded to be added to the special limits clause?
I think we must look upon the protection of the Secretary of State as sufficient for us.

478. Earl *Granville.*] Do I rightly understand the effect of your evidence to be this, that you think it is quite right that some thoroughfares should be subject

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ject to prohibition in this Bill; that you would prefer that those should be mentioned in the Act, and that you think it desirable that the Commissioner of Police, under the authority of the Secretary of State, should be at liberty to extend the prohibition to other streets if they were found to require it?

Yes.

479. Earl *Stanhope.*] I did not understand you to say that you would prefer that those thoroughfares should be named in the Act; I understood you to say that you would prefer its being left to the Commissioner of Police and the Secretary of State?

It would be an advantage, no doubt, to name them in the Act.

480. *Lord Steward.*] Is what you desire to obtain sufficient publicity as to the streets to be subjected to these regulations?

We think we are safer even by the streets being named in the Act of Parliament, or by their being named by the Secretary of State, than by being left to the Commissioner of Police.

481. Earl of *Kimberley.*] As the Commissioner of Police is only to act with the sanction of the Secretary of State, that would to some extent, at all events, remove your objection?

I do not know whether we should have the power of objecting to the recommendation of the Commissioner of Police.

482. Lord *Stanley of Alderley.*] You do not like to say that your objections to the Bill are removed till you see in that Bill the sort of places in which you are to be prohibited from delivering your beer?

No.

483. *Chairman.*] Is there any other observation which you wish to make?

Only the general observation that if the time is limited we are obliged to increase the number of conveyances. One dray could not go to many places in a day, as it can now. You will have an increased number of drays to deliver small orders. Sometimes one of our drays will go to six or seven places or more in a day. If the time were limited, as proposed, they would only be able to go to one or two places; therefore three drays would be required to do the work of one dray. Drays would be made much smaller, in consequence, and you would have an increased number of vehicles; besides which, by delivering at night there is a danger of accidents, and the men are injured, physically and morally, by being employed at night instead of in the day.

484. Lord *Stanley of Alderley.*] Do you do much business in the way of delivering small casks at private houses?

No; except indirectly: it is done by the large bottlers whom we supply.

485. *Chairman* (to Mr. *Fraser*).] Has your attention been called to the provisions of this Bill?

Yes.

486. Will you state your objections to Clause 6?

One very great objection attending Clause 6 is this, that if it were attempted to carry it out, it would be attended with such loss of life and limb as I am quite sure would condemn it in a short time. Since this Bill was before your Lordships, we have had a case before Lord Chief Justice Cockburn, in which his Lordship stated that it was dangerous to the public for brewers to deliver their beer after dark. Previously to that, we had a case before Lord Chief Justice Erle, who, in summing up, stated that he considered the practice of delivering beer after dark very dangerous; and the only excuse for us on that occasion was that it was on Christmas Eve, and an extra quantity was required.

487. Earl *De Grey.*] What was the nature of those accidents?

Falling into cellars.

488. Did the accidents happen to persons connected with your establishment, or to private individuals?

Private individuals. There are, in a radius of four miles from Charing Cross, about 6,500 public-houses and 2,500 beerhouses, making altogether about 9,000. The cellars of those public-houses and beershops are opened, on the average, about twice every week. In the winter time there is no daylight till eight

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eight o'clock; and if we were limited to the hours between one o'clock and ten, there would only be two hours' daylight for us to do our work in. The whole of this work would be done in the night time, greatly to the danger of the public, I am quite sure.

489. *Chairman.*] Up to what hour in the evening do you at present deliver beer?

We begin shooting out the drays at about four or five o'clock; and the last dray will probably come in, having done its work, at about nine or ten o'clock at night.

490. In point of fact, do you deliver some beer after dark; at any rate in the winter season?

We do, a small portion; that is when we are liable to accidents. With regard to the City, I can confirm the evidence of the previous witnesses, that our work is always done by nine in the morning, and we are allowed again to deliver after five in the evening; and between six and seven o'clock practically in the City, even in the great thoroughfares, you can deliver beer with great facility; the streets out of Cheapside and Cornhill are at that time almost as quiet as a desert.

491. How many public-houses are there in the City?

I do not know. The great obstruction to traffic is in the City, and that leads to obstruction in the thoroughfares leading into the City. It is evident that we are not the cause of obstruction in the City, because we do not deliver there in the day time; and Colonel Fraser remarked in his evidence that obstruction is not caused by carriages in motion; though I am aware the public feeling is against our drays, and though if people see them in the City in a block, they think we are the cause of it, the block arises from some other goods being delivered in the City, and our drays being brought to a standstill in consequence. We submit to your Lordships that the proposed prohibition would be a very great hardship to all publicans in the metropolis. By Act of Parliament you now compel them to close at one o'clock, which is a very desirable regulation no doubt, and this Act compels them to open their houses again; a large proportion of them must open their houses immediately after they have shut them, and be engaged an hour or two hours afterwards in taking in the beer.

492. Earl *Granville.*] Do you at present deliver the beer through the same entrance as the customers go in by?

In a large proportion of the public-houses the cellar flaps form a portion of the bar floor; some old-fashioned flaps are entirely on the outside on the pavement, but in the more modern ones they form a portion of the bar-floor; the front part of the shop lifts up, and then the flap forms a portion of the bar-floor.

493. Is it the practice to deliver beer, in those cases, at the same time that customers are being served?

We deliver beer at all hours of the day, with the exception of the City and the Borough.

494. Lord *Stanley of Alderley.*] Do you find any inconvenience in the conduct of your business from the prohibition to deliver beer within those specified hours in the City and in Southwark?

No, we do not; because we are able to concentrate all our strength upon those places, having a large staff, and the work is done easily, and we then turn our attention to places at a greater distance.

495. Do you think if a similar provision were to be extended to the other great thoroughfares of the metropolis, and to those only, that would remove your objections to this Bill?

I think it would.

496. *Chairman.*] Even with the hour of 10 standing part of the provision, or would you suggest a later hour, I mean?

Ten o'clock would be a very good hour to give us; but you might give us some hours in the evening also, the same as we have in the City and the Borough. The Borough is a thoroughfare as crowded as anything can be, and practically no inconvenience is found from delivering beer there in the evening.

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497. In the Borough is there a crowd at the same hour in the evening as there would be, for instance, in Oxford-street?

The thoroughfare is always very crowded, because there are different classes of people always leaving the City, going over London Bridge, and passing through the Borough; it is very much the same as Oxford-street. I think there would be great obstruction if we were compelled to do our work in the reduced number of hours from this cause. I estimate, from a careful table which I have prepared, that it would take two and a half times the number of horses and teams, supposing that the work could be done. I say it is not practicable to do it, but supposing we did aim at doing it, it would take two and a half times the number of horses and teams. Some members of the trade, Mr. Samuel Whitbread, in particular, say that I have taken it too low, and that three times the number of teams and horses would be required to do the work, if it were possible to do it. In our case we should require 200 more carriages than at present, and they would all be left in this area (*pointing to a map*), at ten o'clock in the day, because we should require the time up to the last moment. You would have 300 teams belonging to one house all returning to a spot marked here, which is the position of our establishment, this being the four mile radius from Charing Cross (*pointing to the map*). Our 300 teams, with those of the rest of the brewing trade, ours being a 30th or 40th part of the trade, would all be taking their way to those positions (*pointing them out*), from different parts, a large proportion of them coming through the City, and the number of carriages being vastly increased.

498. Earl *Granville.*] The basis upon which you found your calculation is that with regard to the whole of the space within that radius you are to be prohibited within certain hours of the day from delivering casks.

That is the Bill as I understand it.

499. There is a most important exception, "except in all such back streets or other bye-ways as may be approved by the Commissioner of Police." If there were exceptions enough, and if the prohibitions were confined to the main streets, whether those were defined in the Act of Parliament or were left to the discretion of the Secretary of State, for him to alter them according to circumstances, all the bye-streets and streets into the main arteries being excepted, would you object to the Bill?

The difficulty would be for us to get permission in each case to have a street opened. We say that the streets which are closed should be the exception, and not the rule; whereas this Bill makes the streets that are to be opened the exception.

500. If the converse, as you suggest, were adopted by the Committee, would you agree to the Bill, supposing it contained the provision that certain great thoroughfares should be closed, with power to the Secretary of State to add to those thoroughfares if a necessity arose, owing to the altered circumstances of the neighbourhood?

We should be prepared to accept the 13th clause relating to special limits. I do not think that that which we manufacture should be singled out for prohibition. If you chose to say that in certain streets, or parts of streets, heavy goods should not be delivered, we would bow to such a decision, because we should be treated in the same way as all other trades, but we object to being made an exceptional trade.

501. Your objection is to being exceptionally treated; but you stated just now that as far as the practical inconvenience of being prohibited from delivery during the middle of the day in some of those great thoroughfares is concerned, it would not be an inconvenience to you?

We do not think it would.

502. Lord *Stanley of Alderley.*] Supposing you were allowed to continue to deliver through the whole of the metropolis, with the exception of those great thoroughfares, would you be able to avoid going through those great thoroughfares when your drays were on their way to deliver the beer, and when they were coming back to your brewery after the beer had been so delivered?

In many cases we should; we seek to do so in every case. Supposing that our direct course would be through the City, we know that we are so likely to be blocked there, that we avoid the City. Very often, from places a little north of the City, by getting back into the City-road, we can find a way to our establishment without coming through the City.

503. In many cases would not the great thoroughfares be your most direct road home?

Not where they would lead through the City; the City is the place which would affect us, and which we should affect, being just on the borders of it.

504. Earl *Granville.*] Clause 13, except that it leaves you on the same footing as other trades, gives a much wider discretion to the Police Commissioner and the Secretary of State, putting you entirely at their mercy.

I think not; it is the power which has been suggested, that the Secretary of State and the Commissioner of Police should specify certain streets where we should not load or unload.

505. *Chairman.*] Is there any other point which you wish to mention to the Committee.

Believing that our trade does not cause an obstruction in the streets, I wish to put in one word on behalf of the working men, having been connected with them so many years. At present they finish their work at a reasonable time in the day, and have their time to themselves in the evening, but this measure would cause a body of men, about 300 in number, as far as our establishment is concerned, and a staff of clerks for all future time, to do their work at night. If it were absolutely necessary we should submit to it, but believing that it is unnecessary we feel bound to put that consideration before your Lordships.

506. Earl *Granville.*] On the other hand, do not you think that the obstruction in the streets causes inconvenience to all classes of society?

I do not think we are the cause of it.

507. *Chairman.*] You do not think that the obstruction across the street caused by ropes used for the purpose of letting casks down into cellars, produces any great inconvenience to the public?

It is a part of the great commerce of this City; delivering all goods is an obstruction.

508. Earl *Granville.*] But is there not a difference between taking an hour, or something more, to unload a dray with ropes across the footway, and the dray half way across the street, and the Parcels Delivery Company delivering a small parcel. You cannot put yourselves actually on the same footing as all other trades as to inconvenience?

There are many other trades which would be affected by the Bill. I do not know whether they will be represented before your Lordships. A large proportion of Birmingham goods is sent to London in casks, and a great portion of the pottery ware is also sent in casks.

509. My question had reference to your claim to be put on the same footing as all other trades; do not you stand on a different footing, owing to the nature of your business, from persons who merely deliver, by hand, light parcels which may be easily moved by hand?

But there is a large quantity of very bulky goods, and which are awkward to move, also delivered.

510. Lord *Stanley of Alderley.*] They would be subject to pretty nearly the same regulation as your goods, would they not?

I think there is no reference to them in the Act.

The Witnesses are directed to withdraw.

Ordered, that this Committee be adjourned to Monday next,
One o'clock.

Die Lunæ, *25° Februarii*, 1867.

LORDS PRESENT:

Marquess of WESTMEATH.
Earl of AIRLIE.
Earl STANHOPE.
Earl of LUCAN.
Earl of BELMORE.
Earl DE GREY.
Earl GRANVILLE.
Earl of KIMBERLEY.
Lord METHUEN.
Lord STANLEY OF ALDERLEY.

THE EARL of BELMORE, in THE CHAIR.

Mr. GEORGE LOCKET and Mr. ARTHUR STEVENS DAVEY, were called in; and Examined, as follows:

Mr. *G. Locket*
and
Mr. *A. S. Dave*

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511. *Chairman* (To Mr. *Locket*).] WILL you inform the Committee in what firm you are a partner?
The firm of Locket & Judkins.

512. Carrying on what business?
Coal merchants.

513. Are you authorised to give evidence on behalf of all the coal merchants signing the petition?
Yes.

514. Will you state to the Committee the total quantity of coals delivered daily within the general limits of the present Bill?
The total quantity of all coal delivered daily is about 10,000 tons.

515. What number of horses and waggons are required to deliver that quantity of coals, and how many hours a day do you work?
We work now 14 hours per day, and for every 100 tons of coal (that is taken at the rate of our own business, which is a fair average, I believe, of all the other businesses) we require 25 horses and 10 waggons and vans, making about 2,500 horses and 1,000 waggons and vans employed daily in the delivery of coals within the four miles radius.

516. What is the earliest hour in the morning at which customers will receive coals?
Six o'clock. We have constant refusals to take them in before six.

517. Lord *Methuen*.] Winter and summer?
Winter and summer.

518. Earl *Stanhope*.] Will they take them in as early as six in the winter months?
Shops will do so; such as in Regent-street or any of those places, they like to have them in between six and seven o'clock, so that the dust shall settle before the shops are opened; that applies to any place where there are linendrapers' shops and that kind of shops.

519. *Chairman*.] Does that apply to other trades besides linendrapers; do not other trades dislike the dust?
Most shopkeepers do so; it does not apply to private houses; it is mostly in the case of shops.

Mr. *G. Locket* and Mr. *A. S. Davey.*

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520. Between what hours do you find that the railway companies will allow coals to pass out of their depôts?

Between six in the morning and six in the evening; that is one of the great difficulties which we should have to contend with if this clause stood as it now does. The railway companies bring up all their coals during the night after their passenger traffic is finished; they supply our depôts, by what they call pilot engines, during the night, and take the empties out, and we unload those trucks during the day. If we did our work at night, the railway companies must carry their coals amongst the passenger traffic in the day.

521. How do you mean amongst the passenger traffic?

The trains must come up between the passenger trains; the coals are now principally carried at night, and our depôts are all supplied at night.

522. You mean that they must carry their coal trains along their lines during the day; you do not mean to say that the coal business would interfere with the passenger traffic in the stations?

No; they must bring up the coals during the day time.

523. Will you state to the Committee the general objections which you have to the 6th clause of the proposed Bill?

The general objection is on account of the short hours, which we think would be allowed us, because of the public not agreeing to taking their coals until five or six o'clock at the earliest, and that would leave us only from four to five hours to do the work; in that case we should require 7,500 horses and 3,000 waggons and vans to get the coals out between five or six o'clock in the morning, and 10 o'clock in the morning; that would be about three times the quantity which is now required, and it would be a very large quantity to pour into the streets at any hour of the night. There would also be the difficulty which we should have with regard to the men, in getting the men to assemble at that hour; all our men are paid by piece work; all the coal is moved by the ton and not per day, so that when a man's day's work is finished, he is done with us, as it were, and he is almost independent of us; and the next morning if he does not come to his work, there are odd men to be found at eight or nine o'clock in the morning to take the places of those men who do not come; but if we assembled at one or two o'clock at night, I do not think that we could get odd men to take the place of those men who did not come to their work. Again, a carman would get no assistance in case of any accident. In the day time there is plenty of assistance to keep men out of difficulties, but they would never be able to get any assistance whatever in the night. Then, again, they very often cannot find a person's house, and in the day time they have shops to go to in order to make inquiries, and we have had at times those men stating that they have rung at every house in the street, and have been unable to find the person. At night it would be very unpleasant for a carman to be ringing at every house up and down the street, to inquire whether Mr. So-and-so lived there; the numbers have been a great deal altered lately.

524. Lord *Stanley of Alderley.*] Could not you ascertain those points satisfactorily in the day time, before you sent the coals?

We do so as well as we can.

525. You do not wait to ascertain where the particular houses are to which you have to take the coal till you deliver it, do you?

We take the address at the time when the order is given, but we very often have orders come without any number in the street. The present cost of horse keep and wear and tear of waggons and vans, and sacks, &c., is about 2*s.* 6*d.* per ton, that is merely in the cartage department, that is without wages.

526. Must not that vary according to the point from which you take your coal?

I am giving it on the average, so many tons are done in the year by so many horses and so many waggons.

527. What do you give the carmen?

About 10*d.* a ton.

528. What

Mr. *G. Locket*,
and
Mr. *A. S. Dave*

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528. What do you consider the whole expense of taking the coal from the wharf, or from the railway station to its destination. What is the general addition which you make to the cost of the coal?

About 6*s.* by the water from ships, by barges to the wharf, and then carted in; but by rail we have merely the cartage; we have not to find the barges and the lighterage.

529. The cost of conveying the coal from the railway station to its destination is much less than from the river?

It is less, but then the dues from the colliery to London are more than the freight by steamer.

530. The coal duty is the same in both cases, is it not?

Yes; 1*s.* 1*d.* per ton. At the present time we are paying 11*s.* 9*d.* to Lord Lambton for Lambton's Wallsend, put into our trucks.

531. What do you sell it for?

The dues are 9*s.* 7*d.* by the Great Northern Railway, including City dues; the trucks are 1*s.* a ton, and the terminal dues are about 2*d.* to 4*d.*, making altogether about 22*s.* 6*d.* to 24*s.* 8*d.* a ton, which the coals cost us now in getting them up to the Great Northern Railway terminus, for instance; that is without any wages, any cartage, office expenses, rent, taxes, or any other expense whatever; that is just the net cost of the coal in getting it up to the Great Northern station, before we touch it.

532. Earl of *Lucan.*] Then you have 3*s.* 4*d.* to add to that?

We have to add our general expenses?

533. Besides your profits?

Yes; interest on capital, and other things, those coals cost us 1*l.* 5*s.* 10*d.* at the present time.

534. Lord *Stanley of Alderley.*] Does not it vary from week to week?

No; a contract is for 12 months.

535. But the price of coal in the Pool varies from week to week?

Yes; in the Pool it does.

536. Do you consider that you have deliveries of Lambton's coal by land cheaper than you can have deliveries of that coal by sea?

At times, but we can get it up by sea all the year round by screw colliers cheaper, I think, than by rail.

537. Lord *Methuen.*] Lambton's coal is a more expensive coal than any other, is it not?

No; it is not quite so expensive as Hetton Wallsend.

538. How is it that the coal merchant in London will sometimes sell that coal at 25*s.* a ton?

He has to take the risk of the markets.

539. If it costs you 1*l.* 5*s.* 10*d.* a ton, how can he supply it at 25*s.*, with any profit to himself?

At times there is a loss, and at times there is a profit. We do not take any particular month, but average it throughout the year. A short time ago we were getting 30*s.* and 32*s.* a ton for coal delivered.

540. Lord *Stanley of Alderley.*] That was an exceptional price?

Yes; but coal arrangements are calculated to average throughout the year.

541. What is the present price of Lambton's coals in the Pool?

Nineteen shillings; that includes City dues and freight.

542. Can you sell it at a profit at an additional 6*s.*?

I do not suppose that it would leave us 3*d.* a ton profit. The loss of small coal is one large item which the public are not aware of. We get from 12 to 14 per cent. of small out of all the coals which we bring up by screw steamer; we give for that small coal the same price as for the large, and when we get it up to the wharf we are obliged to screen it, and the small coal is sold to consumers at about 11*s.* a ton, after our expenses are paid upon it.

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543. Lord *Methuen.*] What class of consumers purchase that coal?
It is purchased for steam engine purposes.

544. It is very small coal?
Yes, it is quite small.

545. It is dust?
It is almost dust. We reckon nearly 2 *s.* a ton for loss on small coal—from 1 *s.* 9 *d.* to 2 *s.*; it will vary according to the price at the market. We may give 18 *s.* a ton, or we may give 22 *s.* a ton. In the late severe weather, Lambton's coal fetched 27 *s.* at the market; the loss of small upon that would be very heavy indeed. We do not get a corresponding price for small coal; we are obliged to contract with these parties for small coal for their steam engines, and to supply them all the year round at one price.

546. *Chairman.*] Supposing that the hours were limited, as proposed in this Bill, do you think that there would be much difficulty with regard to customers seeing that the coals were properly screened and weighed?
We could not see that they were properly screened and weighed. We have a foreman who looks over four or five gangs in different barges; in the day time he has his eye on all those men; they have to put the coals in sieves and to riddle them, and they have to throw them about a yard from the sack; that could not be done in the night time.

547. When is it done now?
In the day time.

548. Supposing that you begin to deliver coals at six o'clock on a winter's morning, when do you load your waggons?
At about four o'clock in the previous afternoon.

549. Lord *Stanley of Alderley.*] At what time of the day is your traffic most thronged?
From six o'clock to six o'clock.

550. Is it the same during the whole of the day?
Yes; so many teams keep going in and out, it is all the same.

551. Do you deliver coals in the great thoroughfares in the City now, during the day, or do you deliver them early in the morning; that is to say, in the Strand, and Cheapside, and so on?
We deliver them early in the morning; our first turns are always made to go into any thoroughfare which will be crowded after ten o'clock.

552. How many streets does that include?
About 16, I think, as near as may be.

553. Are they all in the City?
In the City and the West End.

554. To what streets in the West End does that apply?
We do not go into Bond-street, Oxford-street, Regent-street, Pall Mall, and the Strand, during the middle of the day; we make a point of avoiding all those streets during the middle of the day.

555. Do you think that you would be able to conduct your business satisfactorily if a few additional streets were added to those where you do not take coals now, except in the morning, and if you were precluded from sending them there within the prohibited hours?
It would be a great inconvenience to us, on this account, that now we find great difficulty from not having sufficient teams; we now very often have to hire an extra team or two on purpose to get a few more loads in in crowded thoroughfares before the traffic becomes excessive; and if we had a still greater number of streets in that position it would be an extra expense and trouble to us; but that we should not mind if you could name the streets; I have sketched out some of the streets.

556. Will you read the names of the streets which you already serve in the early part of the day only, and state what addition to them you think might fairly be made without inconvenience?

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In the West-end we now avoid Regent-street, Piccadilly, Bond-street, the Strand, and Pall Mall; in the City we avoid Lombard-street, Cornhill, Cheapside, the Poultry, Ludgate-hill, Fleet-street, Newgate-street, King William-street, Gracechurch-street, and those City streets.

557. *Chairman.*] Is it not the case that in the City you are at present limited as to the hours at which you may deliver coals?

I believe that there is a rule of that sort in the City; but that has no effect with us, because we do not go into the City after that time. All our work being done by piece-work, it would not be fair to send these men into crowded thoroughfares, which are blocked up during the day, because they would earn very little money; we want them in and out as quickly as possible. We thought that something to this effect would answer the purpose: "No coals shall be loaded or unloaded in any of the following streets, between the hours of ten a. m. and five p. m., and no coal-waggon, van, or cart shall be allowed to stand in any street within four miles of Charing Cross, excepting for delivery." So that within four miles of Charing Cross we should like the waggons to be sent out of the streets altogether after the coals are delivered, even in the bye streets.

558. Lord *Stanley of Alderley.*] I do not suppose that your carts stand after delivery?

No, except that if a man gets 2 *d.* or 3 *d.*, and spends it at the first public house, which would be an obstruction to the traffic which we should be very glad if the police would help us in obviating.

559. What streets do you propose to add to those which you have mentioned?

We have 21; namely, Oxford-street, Regent-street, Piccadilly, Bond-street, Holborn, Strand, Whitehall, Pall Mall, St. James's-street, Lombard-street, Cornhill, Cheapside, Poultry, Ludgate-hill, Fleet-street, Newgate-street, Leadenhall-street, King William-street, Fenchurch-street, Gracechurch-street, and Queen-street. Sir Richard Mayne said that there was a great difficulty in naming the streets, as the streets altered with regard to the traffic.

560. In order to meet that difficulty, would it not be possible to leave a discretionary power with the Police Commissioners, under the authority of the Secretary of State, to add any such streets.

We should have no objection to it, if there was some provision to this effect: "in any streets, not exceeding 30 in number, to be named as occasion may require, by the Secretary of State;" because if one street became quiet you might still put another in its place, and this would still give nine streets to be created into large thoroughfares, which we think would take many years.

561. Still that is conjecture, whereas in the other case it would be upon experience. Do you not think that it would be better for the Secretary of State to make any alterations in the streets which experience might show him were desirable?

The Secretary of State, no doubt, would protect our interests; but we certainly should have a great objection to streets being named in any way by the police; and the great object which we have in naming a number of streets is that we should know those streets; they would be very easily published; it is easy to give your men 30 streets. Sir Richard Mayne says, "Publish those streets in which we may deliver." That would be so many thousand streets to cram into the heads of our men, who are not the brightest set of men.

562. Would it not be sufficient every month, or every half-year, to name the streets in the "Gazette," which would give sufficient time to tell your men where they might go. I allude to the prohibition?

Yes, if it was stated half-yearly, if one street was added and another street taken away; there is no difficulty if the streets are named.

563. Earl *Granville.*] Is there any probability of any street becoming quite empty, so long as it is a public thoroughfare?

Still there would be 30 streets. It is very important with us to have as few restrictions as possible.

564. If the Bill indicated the intention of the Legislature that this unloading should be prohibited in the middle of the day in certain great thoroughfares, that would be sufficient?

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Then we should have a list given to us of those streets in which we might deliver.

565. You accede to the principle that there should be a limit to the streets?
We should have to know the names of the streets in which the Secretary of State allowed us to deliver, if the clause stood as it now does.

566. What reason is there for limiting this number of thoroughfares to 30, when it is quite obvious that there may be 31 important thoroughfares as well as 29?
That is so, but it would be many years before nine great thoroughfares would become so crowded that we must not go into them within certain hours.

567. Lord *Stanley of Alderley*.] There might be a new thoroughfare which was very much frequented, and which would come into use, while all the old 30 thoroughfares would be so crowded with traffic as that none of them should be taken out of the list?
We think that it would be so many years before such a thing would take place, that there would be fresh legislation; certain parts of London might be remodelled before then.

568. The Committee are to understand that you are quite willing to agree to the principle of the limitation of the traffic, within certain hours, to certain streets?
Yes, in the delivery of coals.

569. And you think that you would not suffer much inconvenience?
Yes; another great inconvenience would be to small dealers who have coal-sheds. A large quantity of the coal used by the poor is retailed out by greengrocers at coal sheds; these men go in the morning to fetch greengrocery from Covent Garden, and afterwards they come to us at about nine or ten o'clock to fetch a few tons of coals; that goes on during the day.

570. Are not all the shops where this retail trade takes place, in the small streets; very few of them, I imagine, are in the great thoroughfares of the town?
That is so; but if this clause stood as it is now, these men could not fetch their coals during the day time.

571. With the alterations proposed, they would object to it?
Certainly.

572. Are you of opinion that the area of four miles would interfere with you very materially?
Very materially indeed; there are 3,000,000 tons at least delivered within four miles; if it was done at night great robberies would take place from houses being opened; ticket-of-leave men would get to our men, they would say, "To-morrow morning I will change clothes with you, I will go and do your work, and when I come out you shall go home with the waggon again," and we do not know where it would end; we should be blamed for all these things. There is no communication with the top story of the house; if a man rang the bell, he would wake the parties right and left of him, and I think that it would be a great nuisance to the whole of the servants up-stairs. A large consumption of coals takes place in these thoroughfares, where parties live in flats, where the men often have to carry half a ton of coals up to the second floor, and another half-ton of coals up to the third floor; they have mostly, of course, to be carried up-stairs; and the men have to go and open the traps in the pavement.

573. Is there a large delivery of coals by road to the manufactories in London, or are they mostly situated near the river, so as to be able to get their coals from the river?
A great many are delivered by waggons.

574. *Chairman*.] Have they to go across the pavement?
In most of the printing establishments where the daily papers are printed, the coals have to be delivered up a court at the back; we have to do that in the morning. In the case of most of the consumers who have large quantities, we have to deliver them in the morning.

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575. Earl of *Airlie.*] Do you deliver any coal after six in the afternoon?

At times; there are two or three of the banking houses which we supply where they ask us to send in the coal after six o'clock in the evening, but that is mostly in the summer time. At Jones Loyd's, for instance, they have the coals in the evening in the summer time; they will not allow us to deliver them in the morning, but they have them in the evening, and they get the dust cleared away by the morning; I, therefore, think that if you could make the hours in the evening soon after five o'clock, we might do a good deal of that work in the evening?

576. Lord *Stanley of Alderley.*] After you had made your deliveries, would it be any inconvenience to you to be prevented from going into the great thoroughfares in returning home?

Yes, it would entail upon us extra teams; we now get three turns per day out of them, and then we should not get three turns out of them; we now know where the men are going, and when they will be back, and the foreman has his next load ready; but if they are told by the police to go round they will be a longer time; and even if they are not sent round they will, perhaps, come home with a lame tale, and tell us that they have been sent round, and we should not know where they ought to be.

577. *Chairman.*] Would they not very often get home as quickly by going through the back streets as by going through the main streets, which are so crowded?

But they really do come home in that way, because they are paid by piece-work, and they do not want to be more stopped than they can possibly help.

578. That being so, does not the objection made in answer to the last question rather fall to the ground?

Our men are not always what they should be; sometimes they have a little more to drink than at other times, and I wish them to be sent out of the streets; I do not wish them to stop at public-houses.

579. Lord *Stanley of Alderley.*] Cannot they generally get back to the place from which they originally came, through the bye streets, as well as by the main streets?

Sometimes they can, and when they can, there is no objection to it at all; but to be sent round a long distance would entail a great expense upon the merchants in keeping extra teams, and we should not be able to keep our supply regular. It is a very heavy trade, and a very expensive trade to carry on.

580. Earl *Stanhope.*] How many horses do you keep in your firm?

Forty-four, I think. When you spend 50 guineas a-piece for horses it is a heavy item, and it requires a large capital to carry it on, and if that expense is much increased it must increase the price of coals to the public.

581. *Chairman.*] When you say that you would be sent round a long way, would not the police be likely to send you round by a parallel street at no great distance?

We should hope that they would send us round by the nearest way.

582. Would they not do it in order to accomplish their own object; in order to keep Pall Mall clear there would be no object gained by sending the waggons into Piccadilly?

Our men are very pig-headed, and if they came into collision with the police, and were ordered to go where they did not like to go, I thoroughly believe that in many cases our carman would throw down his whip and say, "I have earned my money, take the waggon where you like." They sometimes demand their money at any particular part of the day.

583. Lord *Stanley of Alderley.*] If the power was given to the police to stop them, do you not think that a man would rather take the way in which he was directed by the police to go instead of going to prison?

He might do so rather than go to prison.

584. Is the pig-headedness of your men a sufficient reason to prevent a regulation being enforced?

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Not if it is for the benefit of the public, but we do not consider that we do block the streets except by delivery; as long as we are kept moving we do not do so.

585. Earl of *Lucan.*] What are the general earnings of your men?
From 32 *s.* to 38 *s.* per week.

586. Besides what they get from the customers?
Yes, which they always say is nothing. Sir Richard Mayne said that the traps might be kept open in the pavement of a night, but people now are bound to keep the traps closed, and our men always have to go in and unfasten them. I believe that there is a law that you must keep these iron traps fastened.

587. *Chairman.*] Sir Richard Mayne did not mean to say that you should take away the trap altogether?
No, but it does not fit so tight as to prevent its slipping on one side if it is not fastened underneath; it is a very dangerous thing.

588. Is there any other observation which you wish to make?
No, I think not.

589. To Mr. *Davey.*] Are there any points upon which you wish to make observations?
No; I quite concur in everything which Mr. Locket has said. I do not see any other point which occurs, unless your Lordships wish to ask me any question, which I shall be happy to answer. (Mr. *Locket.*) Sir Richard Mayne said that he thought that we might load up our waggons during the daytime, as farmers load up their carts in the farmyards during the day, and send them out at night. In order to accomplish that, we should require at the water-side premises such as cannot now be found, because the waggons are 6 feet 6 inches wide, and to back such waggons during the daytime so that they could be loaded during the daytime, we should want premises about 200 feet wide, which it is very difficult to get.

590. Earl *Granville.*] What width have you now?
About 60 feet. (Mr. *Davey.*) Our wharf is about the largest on the water-side, and we have about 90 feet; that, I believe, is about the largest in London.

591. Earl *Stanhope.*] Have you any experience of a local custom in the City by which it is said that such traffic is precluded within certain hours?
Thus far we have experience of it, that if we are provided with any orders from the City, we, for our own sakes knowing that our traffic will probably be blocked by other traffic, send our coals early in the morning in what we call our first turn; and in the City, as the traffic is generally finished at five o'clock, we deliver a great many coals after five o'clock.

592. Therefore you conform to these regulations so far as the City is concerned?
Yes, for our own sakes. (Mr. *Locket.*) We are allowed to pass through the principal streets in the daytime. (Mr. *Davey.*) Yes; for instance, if I want this afternoon to send coals from my wharf at Blackfriars to St. John's Wood, I am perfectly at liberty to pass through Regent-street, and I do not block Regent-street.

593. We are talking of the City?
If I want to deliver coals at the east end of London I am at perfect liberty to pass through the City at any hour of the day. I believe that there is some law in the City preventing us from delivering coals in the middle of the day, but we should not do it because it would detain our waggons too long. (Mr. *Locket.*) The wages of the coal porters are double by night what they are by day, and it being all piece-work; that is a great difficulty. Everything which is moved in coals is moved per ton.

594. *Chairman.*] Do you ever do any work with barges now at night?
Never. (Mr. *Davey.*) The only case of that sort is in the event of a steamer going away at night. (Mr. *Locket.*) I do not think that our men would do that at night. They have to be very careful when they go along long planks. I do not think

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think that the men would undertake it with 2 cwt. on their back. (Mr. *Davey*.) They would not undertake it.

595. Lord *Stanley of Alderley*.] Has it ever been considered probable that the Metropolitan Underground Railway will be used for coal?

(Mr. *Locket*.) To the south of London.

596. But not to the centre of London, having a station at Farringdon-street?

I do not know how they would get coals up from below; it has never been proposed.

The Witnesses are directed to withdraw.

MR. JAMES JOHN MILLER, is called in; and Examined, as follows:

Mr. J. J. Miller.

597. *Chairman*.] Do you represent the Railway Companies?

No.

598. Do you represent the Coal Merchants?

I am the Agent of an Association of Coalowners, who are now bringing into London by the Great Northern Railway something like 156,000 tons of coal a year, all of which is delivered within a radius of four miles from Charing Cross.

599. Will you state what your objection is to the 6th clause of this Bill?

One great objection is, the facilities which it would give for robberies of coal by carmen. It is already well known that robberies do take place, and that to a very large extent. It appears to me that if all coal were delivered in the dark, at midnight, the carmen would have an almost unlimited power for disposing of the coal, and I cannot see how the consumer would have any power of checking it. I cannot understand how any servant would go out and check the coal at two or three o'clock in the morning.

600. Do servants practically check the coal now?

They are supposed to do so. We send a delivery ticket, saying, "Take care that you are to receive" so much, and if they do not check it, it is their own fault. An Act of Parliament, already in existence, says that we are to send weights and scales with each waggon. That appears to me to be perfectly useless if the coal is delivered at or after midnight. You could not possibly tell that you had the proper amount of coal, or the proper number of sacks; you would take no pains to ascertain that there was the right amount of coal.

601. Earl of *Kimberley*.] Do you think that the servant would get up at all?

I think that it would be very doubtful, and that there would be a vast amount of delay. I think that the carman would have to remain outside a very long time before he woke the servant up. There is another point, namely, the facilities which this Bill would afford for robberies in the houses of the customers. Then, even supposing that we could get carmen to deliver coal at these unseemly hours, yet what dangers there would be for them. Fancy a man delivering down a dark staircase at two or three o'clock in the morning; he would stand a very great chance of breaking his neck. Then there is another thing, namely, the difficulty of finding the place where the coal is to be delivered. It is difficult enough now for an educated person to find places in London. Then there is the question of frosty weather. We have had an example of that quite recently. We found it impossible to deliver the coal, even in the day time, while the roads were in that state, in consequence of the frost and snow; but it is perfectly well known that the roads are very much worse at midnight.

602. Lord *Methuen*.] If you could not deliver coals in the day time, you could not do so in the night time?

It would be quite impossible.

603. Earl of *Kimberley*.] What I understand you to mean is, that the roads at night are much more often in such a state from frost that you cannot cart along them, even in the daytime.

Yes,

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Yes, they are worse in the night than in the day time. Then I may observe, that the coal trade varies very much: sometimes we should book 100 and sometimes 600 tons, and therefore it is an impossibility with us to fix the day or the hour of delivery: and if we could not do that what an awkward thing it would be for any one, or any one's servant, to be up in expectation of the coming of these coals. We depend very much upon the railways; if there is an accident the supplies do not come up, and we cannot keep our appointments. If this Bill becomes law the servant of the consumer must keep up night after night till the coals come. Then there is the effect upon the railway traffic. Supposing that this Bill were to pass into law, all the coal vans, as it appears to me, would be stopping at the depôts at one particular time, because I apprehend that even if the Legislature should pass this Bill, you would not get the great majority of the public to take their coals at night. In spite of all the legislation in the world they would say, " I will have my coals in between six o'clock and 10."

604. Lord *Methuen.*] Do you think that the public would rather be frozen to death than keep themselves warm?

I think that they would rather pay 5 *s.* or 6 *s.* in addition to the present price than open their houses at an unseemly hour to the depredations of carmen. These men are of very questionable character now, and I am sure that it would be much more difficult if you confined this work to nightwork. The public would look at it individually; they would say, " I will have my coal between six o'clock and 10." Then we should be reduced from 14 hours, during which we work now, to four hours; and I do not see how we could carry on our trade within those limited hours unless we made a very vast addition to the price of our coal. The public would have to pay for it. We must multiply our horses and vans by four, and must pay our men extra wages, and, in short, the public would have to pay a very increased price for it.

605. You take four. I think that another witness multiplied it by three?

We now work 14 hours, and practically, this Bill would say, " You shall only work from six o'clock in the morning till 10." No one will take in coals before six o'clock in the morning. I do not believe that the coal merchants are opposed to the spirit of the Bill, it is to the interest of all of us that the streets should be kept clear, and we should really be obliged to your Lordships if you passed any measure which would compel our men to return home after the waggons are unloaded; but I should like to put to your Lordships this one fact, that in the City of London we are already restricted to delivery within certain hours; we do that, and although there is no legislation upon the matter, we are restricted in the principal western thoroughfares, Oxford-street, Regent-street, and so forth.

606. Lord *Stanley of Alderley.*] Do you see any objection to extending that limitation, which, at present, practically exists as to the delivery of coal, and that you should be prohibited from delivering coal in the great thoroughfares of the town within certain hours, leaving the rest as it is now?

I do not see any great objection, but it does not appear to me that any legislation is required, because the question settles itself; no one will take coal within the other hours, it is against his interest to do so.

The Witness is directed to withdraw.

MR. JOSIAH GRIFFIN, is called in; and Examined, as follows:

Mr. *J. Griffin.*

607. *Chairman.*] WILL you tell the Committee of what company you are the Secretary?

The Surrey Commercial Docks.

608. Will you describe the locality of those docks?

They are at the extreme south-east of the four-mile radius, where it touches the Thames. These docks have been established for upwards of half a century, and they have a great depôt for wood goods imported into the port of London. The other dock companies, the London, the St. Katherine's, and the East and West India Dock Companies, take a very small proportion of wood goods. In 1866 the total imports into London of timber for building purposes were 180,000 loads of timber and 11,200,000 pieces of deals. The Surrey Commercial Docks received of that quantity 150,000 loads of timber and 10,000,000 pieces of deals, so that by very far the largest proportion of those goods was received at those docks.

609. What is the size of the docks?

The docks and ponds for the storage of timber occupy 160 acres, and the yards and piling grounds are 190 acres; the whole is 350 acres, and the whole of that space is fully occupied throughout the year with these goods, and it is scarcely adequate for the growing requirements of the trade.

610. What is the capital of the company?

About 1,450,000*l.* The various timber yards, saw mills, and builders' yards, and the public and private works throughout the metropolis are supplied chiefly from these docks daily, and therefore the traffic is very large.

611. Will you state to the Committee the objections which you have to clause 9 of the Bill?

The objection is, that any such restrictions as are proposed by this clause would very materially affect the interests of the timber and building trades, as it would be perfectly impossible to carry out the loading and delivery of these goods within the hours named.

612. What are the particular words in that clause which would limit you?

Clause 9 is, " No person shall within the limits of the first part of this Act, and between the hours of ten in the morning and seven in the evening, except with the license of the Commissioner of Police, 1. Drive or conduct along any street any cart, carriage, or other vehicle laden with timber, iron, metal, or any other article exceeding in length 25 feet, or in breadth 8 feet 6 inches, or any cart, carriage or other vehicle laden with timber, iron, metal, or any other article protruding more than three feet behind or in front of the vehicle, or more than one foot from the sides of the vehicle."

613. What is the ordinary length of the timber which you send in loads through the streets?

It averages from 30 to 35 feet in length. The timber trade is divided into two parts; there is the square timber, and there are the deals. The timber runs from 15 to 50 feet in length; the average is about 30 to 35 feet, and the deals run from 10 to 35 feet.

614. Earl of *Kimberley.*] Are they not rather longer now than they were formerly?

Yes, I think that they are rather longer, generally speaking. I may say, upon this clause, that daylight is indispensible in the selection and loading of these goods.

615. *Chairman.*] What do you mean by the selection of them?

The timber is rafted in the ponds, that is to say, the number of the piece, the length, and the dimensions are scored on each piece of timber, and they are made up into rafts and for delivery; it is necessary that the man should see those marks, in order that he may compare them with the delivery order. It is the same with the deals; the deals are piled away, and the length, and breadth, and thickness of each deal are marked upon the deal by chalk marks, and it is necessary to see those marks in order to make the delivery.

616. I think that there are restrictions in the City at present with regard to the carriage of timber through the streets?

There are; but there is an important difference between the City bye-law and this law which is now proposed.

617. Lord *Stanley of Alderley.*] What is the City bye-law?

The City bye-law is to this effect: "That no person shall drive any cart, waggon, or other vehicle, wholly or partially laden with timber, scaffolding, or other poles, logs of wood, masts, spars, or other articles or things, whether consisting of wood, metal, or any other material exceeding 25 feet in length, or 8 feet 6 inches in breadth, through any street, between the hours of nine in the morning and six in the evening."

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618. How does that differ from this clause?

The difference is this, that in clause 9, the first part of the 1st section of that clause runs with the bye-law; but there is this important difference, that it goes on to say, "or other vehicle laden with timber, iron, metal, or any other article protruding more than three feet behind or in front of the vehicle, or more than one foot from the sides of the vehicle."

619. Then, as far as the City is concerned, that is the only addition to the present law which can affect you in the carriage of timber?

Yes. I may state that, although the restriction in the City bye-law is a great inconvenience to the trade, yet, practically, they can get over it by driving round, the area of the City being very small, comparatively speaking.

620. That is for the delivery of goods beyond the City?

Beyond the City, or through the City; where they would require to go through the City, for instance, to Whitechapel.

621. But under that bye-law you cannot go through the City within certain hours, can you?

Not with goods exceeding 25 feet in length.

622. If you have to deliver any timber in the City for buildings going on, you can now deliver it before the hour of nine in the morning?

Yes.

623. Do you experience any great inconvenience from the existence of that bye-law?

The area of the City is small, and therefore there is not so much practical inconvenience experienced; but when you come to extend that limit to a four-mile radius from Charing Cross, it becomes quite another question.

624. Would the enactment of this regulation regarding the extension of three feet beyond the waggon affect you very materially?

Yes, very much so.

625. Would not that be met by making your carts or waggons of a greater length, in which case the timber would not protrude more than three feet beyond them.

I will just explain how it would affect us. For timber deliveries, waggons from 14 to 18 feet in length are used, the extreme being 18 feet.

626. It was proposed by one of the former witnesses that the length of protrusion should be extended to eight feet at each end; would that meet your difficulty?

Eight feet at each end would make a material difference; it would certainly be an easement upon the stringency of the clause, but I do not know that it would fully meet the case. If your Lordships will allow me, I will explain to you how the deliveries are now effected. The shortest timber waggons are 14 feet and the longest 18 feet; those are used chiefly for the conveyance of square timber.

627. *Chairman.*] What is the average length of square timber?

Thirty to 35 feet. If the overlap upon those waggons were restricted to three feet, the effect would be that they could not carry anything exceeding 24 feet upon an 18-feet carriage, nor anything exceeding 20 feet upon a 14-feet carriage. That is as applies to timber waggons, but deals are very frequently loaded upon builders' carts, and not upon waggons; those carts are usually about 5 ft. 6 in., to 6 ft. 6 in. long, and they at present carry deals of at least 20 feet in length. The effect of the Bill upon those goods would be that allowing three feet at each end, it would practically restrict them to 12 ft. 6 in.

628. Lord *Stanley of Alderley.*] If you were restricted to eight feet, the case would be different?

It would give 20 feet, and even that would be within the limits of 25 feet.

629. *Chairman.*] Under what regulations is the business of the docks now carried on?

The premises are open for the delivery of goods from the 1st of March to the 1st

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1st of November, at eight o'clock in the morning, and the deliveries are made until four o'clock in the afternoon, and for the remaining part of the year the premises are open at nine o'clock in the morning, and the deliveries are made until four o'clock; but we make it a rule that deliveries which are commenced before four o'clock are generally permitted to extend to half-past four or five. Those hours were fixed many years ago; in fact, they have been in existence as long as the docks, and they are found practically to be the hours during which the business can be properly carried on.

630. Lord *Stanley of Alderley.*] How long have these regulations been in force within the City, with regard to the conveyance of timber?

Since the 31st of May 1864.

631. Earl *Stanhope.*] What was the system previously?

The system previously to that was that there were no limits at all; waggons went through at any time.

632. Lord *Stanley of Alderley.*] Do you think that you would be able to conduct your business with advantage if that prohibition which is in existence in the City were to be extended to the other great thoroughfares of the town, leaving the great bulk of the town as it now is?

I think not, because there is this difference; that the timber traffic is what may be called a through traffic; that is to say, the goods would require to pass along these principal streets in order to get to their destination. The goods, in nine cases out of ten, are not actually delivered in these principal thoroughfares, but it is absolutely necessary for them to pass along those thoroughfares in order to get to their destination at some distance off.

633. You would not object to a prohibition to your delivering them in any of those streets?

I would just draw this distinction, namely, that we do not deliver the goods; I speak of the impracticability of loading the goods at the docks; it would be more a question for a merchant to answer, who knows precisely what the effects of it would be upon the trade, and I believe that there are merchants present who will be able to give an answer to that question.

634. *Chairman.*] Do you think that it would make a very great difference if, for instance, Bond-street were exempted from the streets along which you might drive goods, and if you were obliged to take them along some parallel street?

I do not myself think that it would, but I am not exactly in a position to state what the bearing of that question might be upon the trade; I think that it might be necessary to get along Bond-street, in order to get to streets on either side of it.

635. Lord *Stanley of Alderley.*] What route do the vehicles take in your trade to the north of London?

They go over Westminster Bridge, and therefore it is a very long and circuitous route.

636. You would not feel it to be any difficulty if you were precluded from going along, say, Holborn?

If there was power to cross those streets, I think that it might meet the object in view, in a great measure.

637. In point of fact, as I understand you, you do not make use of those streets for the purpose of conducting your business?

We do not use the streets at all; we merely load the timber merchants' waggons and carts upon our premises, and they proceed; we are not carriers of the goods.

638. If you do not speak as to the conveyance of your goods, what evils do you suffer?

I speak of the inconvenience of loading the goods upon the premises.

639. Then, would it meet your case if you were taken out of the operation of this Bill, as far as your premises were concerned, and if the area, for instance, instead of being four miles were three and a half, or three miles?

No; the objection would still apply.

640. Not as to loading?

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Not as to loading, but as to getting off the premises. As the matter stands now the goods could not leave our premises at all, supposing them to be delivered, because we are within the radius.

641. But supposing that the radius was three miles instead of four miles?
Then they would only have the distance to go between our docks and the radius, namely, one mile; it would not allow the parties to deliver their goods all over London, as they are now delivered.

642. You would not be affected by it, but the person buying the timber from you would be affected?
We should be affected in this way, that the delivery would be called for from us at times when we could not possibly deliver the goods. We now deliver between eight in the morning and four in the afternoon; and if you circumscribed the delivery in the way proposed, we could not load the carts or the waggons in the time. Our present deliveries amount to about 29,000 pieces per diem, of which about 18,000 are delivered by carts and waggons; the remainder go by water to the various yards on the banks of the Thames, and from thence are re-distributed. With timber it is the same; and as respects the delivery of timber, the rafter has to proceed to select the timber by walking along a float of timber in the pond, and he there marks off the pieces; or in the case of a whole float, he takes the whole float up to a convenient part where it can be loaded on to a waggon, which loading on the average occupies about an hour.

643. Earl of *Kimberley*.] Your objection, as I understand it, is to having to load this timber in the dark?
Yes; we could not do it in the dark; those marks which I have spoken of are requisite to be seen.

644. Could you do it during the hours of daylight which are allowed by this Bill?
We should not have room upon our premises to accommodate the carts and waggons which would come to our docks; there are about 375 carts and waggons coming to our docks in the day, and we should not have accommodation upon our premises for them during the time of daylight which would be allowed.

645. How many available working hours do you consider that this Bill would allow you?
I may say two hours in the morning; in the summer-time from eight o'clock till ten, and in the winter from eight to ten.

646. Is it not daylight before eight o'clock in the summer-time?
Yes, but we do not commence our deliveries before eight o'clock.

647. Is there any reason why you should not do so?
The labour rates are based upon these hours of work, and if we were to require our men to come at other hours, the effect would be to increase the rates of labour.

648. Would that be so even supposing that the number of hours during the latter part of the day was curtailed during which work had to be done?
We finish our deliveries at four o'clock in the afternoon, and the Bill proposes seven o'clock.

649. *Chairman.*] Do you find it more expensive to deliver goods in the City now than in other parts of the town?
We do not deliver goods in the City.

650. Do you not send goods into the City?
No, we are not carriers of the goods; we merely load the waggons which are brought to us.

651. Timber goes from your docks to the City?
Yes.

652. Is it more expensive to load those goods going to the City, than to load goods not going to the City?
No, because we load them in the working hours of the day; the deliveries are effected,

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effected, we will say, in the afternoon; the goods are drawn up on the south side of London Bridge, and they stop there till six o'clock, and then they go over.

653. Lord *Stanley of Alderley.*] But still, as far as you are concerned, you not being deliverers of timber, but merely the parties placing it upon the waggons, if you were taken out of the regulations would you have any ground to complain, so far as you were concerned, if the area was a three miles' radius instead of four miles; there would be no difficulty in your case?

Yes, there would be this difficulty, that the carts would all come upon us at one time.

654. That is supposing that the carts could not get away, but if the carts were there you would not be prevented from loading?

No, but I will take a three miles' radius, and will show its effect.

655. You have stated that you have nothing to do with the delivery: so far as you are concerned, what would there be to prevent your loading the goods, if the carts were there, if the area was limited to three miles instead of four miles?

Simply that we could not accommodate the number of carts and waggons which would come upon us at one time; because not having the whole of the day to work in, we should have to load them at one particular time, and we could not accommodate them.

656. Lord *Methuen.*] And your men would remain unemployed during the whole of the day?

Yes, if we were restricted to delivering during the night, or within the hours allowed by the Bill.

657. Earl of *Airlie.*] Supposing that this clause ran in the same way as the City bye-law, would that meet your objection?

No, because practically it would amount to this, that you should not deliver particular goods within a radius of four miles from Charing Cross. It would, no doubt, be a modification if it was restricted to 25 feet; but I do not think that it would meet the entire case.

658. Lord *Stanley of Alderley.*] Supposing that the buyers and distributors of your timber said that they could carry on their work, you would then have no difficulty, and no reason to complain?

Precisely so. If they said that, and if they came to us at proper times for delivery, and conformed to our operations as to our hours of delivery, we should have nothing to say. But I apprehend that that is just the gist of the case, namely, that they could not do so.

659. You say that you are not a deliverer of timber, and that you have nothing to do with it after it is taken out of the docks; therefore the difficulty of conforming to these regulations applies to others, and not to yourself?

I only speak from my general knowledge. I cannot, of course, speak practically as to what they do in the streets.

660. Nothing could prevent them from getting their delivery from you, if they came, and if the area was altered with regard to your docks?

If they came and did not come all at once, we could deliver to them; our area is limited; we could not accommodate the whole 375 carts and waggons which come to us every day, if they came to us at one particular time of the day.

661. Is not that assuming that the whole of the traffic would be stopped?

Yes.

662. Supposing that the deliverers of timber say, "If we were limited to certain great thoroughfares within these hours, we could get through our work by delivering in those places within those hours, and we could go to other places later," there would be nothing in this Bill which would affect you so far as regards loading the carts from your canal, supposing the area to be altered from the four to the three miles?

There would be nothing in it, certainly, if the trade could carry on their business within those limits.

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663. Earl of *Kimberley*.] Could you transact the business at your docks in a shorter number of hours than you now have without serious inconvenience, supposing that you were compelled by law to do so?

We could not.

664. You require the whole number of hours now employed?

We do; we pay about 2,000 *l.* a week in wages at the present time, and we could not possibly do the work in a less number of hours.

665. If you increased the number of dock labourers could not you then do it?

No.

666. Is your reason that the area of the docks would not afford accommodation for more rapid delivery?

You could not, for instance, put more men to load a waggon than are employed at the present time.

667. I understand you to say that you could not load more waggons even with more labourers, than you do at the present time?

We find it exceedingly inconvenient, even now, to load the numerous waggons which apply to us every day, and if we had a greater number to load we certainly could not do it without very serious inconvenience.

668. Do you think that you could do it?

I do not believe that we could do it at all.

669. Lord *Stanley of Alderley*.] I think you said that about half your traffic went into the river, and was taken down by the river to the yards at the side of the Thames?

Out of 29,000 pieces per diem, about 18,000 are delivered by cart or waggon.

670. Earl of *Lucan*.] I think you said that you commenced business in the morning in the summer at eight o'clock?

The deliveries.

671. And that you were not in the habit of loading any carts after four o'clock in the afternoon?

No.

672. What difficulty would there be in the summer in beginning at five o'clock in the morning, and working till six o'clock in the evening?

We should require a double gang of men, or, in other words, we must pay twice the wages which we now do. We must double the number of men, doubling their wages would not do it. It is very hard work for these men, and we find by practice that those hours are the hours in which we can get the work out of them best, and if the time was extended we could not get the work out of them.

673. Earl *Stanhope*.] What is the area of your docks?

Three hundred and fifty acres.

674. In what year were they first established?

In 1810.

675. Is that the original area or have they been increased?

The docks have been increased at different times.

676. But you think that if this Bill passed the extent of the docks would be inadequate for the accommodation of the carts which would come at one particular hour

I am quite sure of it as regards our particular position.

677. Earl of *Airlie*.] Are your men paid by the day?

No; these men are paid by piece work, they are paid so much a standard; deals are calculated by standards, and timber is calculated at so much a load.

678. *Chairman*.] Is there any other point on which you wish to make any observation?

There is just one other point, namely, that the wood trade is increasing year by

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by year, and the tendency of the improvements in the metropolis, and so forth, is to make the ground which has been available heretofore for builder's yards and deal yards in the metropolis more valuable, so that the deliveries are thrown more in detail upon us than used to be the case formerly; where we used to make one delivery, we, perhaps, now make three or four. The wood is taken away more in a retail character than it used to be many years ago.

679. Earl of *Airlie.*] If your men are paid by piece work, why should you not begin earlier in the day, and leave off later?

I have stated that daylight is indispensable for this operation; there are only certain hours during which they can do the work. If the hours were extended, the whole of the staff at the docks, besides the labourers, must be there in the morning, because when the orders are presented, they must look through the books and see that they are correct, and they must pass on the orders to the proper heads of departments, and therefore the men could not work, unless the whole establishment were there.

680. Lord *Methuen.*] I suppose that the work which the men now undergo, is as much as a strong man can do in a day?

We find it to be quite so. In cases of urgent necessity, which sometimes arise, we find very great difficulty in getting them to work beyond certain hours.

681. Lord *Stanley of Alderley.*] I think that you have said that the enforcement of those regulations in the City, preventing your taking your timber through it, has not materially affected you?

That is so.

682. Is it not probable that an extension of that limitation might equally be adopted without inflicting so much injury as you seem to anticipate?

It would, of course, altogether depend upon the extent.

683. *Chairman.*] Of course any extension of the limitation short of Westminster Bridge would not affect you?

It would not affect us as regards that portion, but there is a very large portion to the west and north-west, with regard to which we should be affected.

684. A prohibition of your taking timber along Charing Cross and the Strand would not affect you in the least, would it?

I do not think that it could be taken to the west and north-west, St. John's Wood and Kilburn, for instance, unless it could cross those streets; there would be no occasion for the goods going along those streets in order to get north and south, but they want to get through.

685. Lord *Stanley of Alderley.*] I understand you to say, that the extension of the permission for the timber to project beyond the front or back of the waggon from three feet to eight feet would remove a good deal of the difficulty which you feel as to this clause?

It would remove a great deal of the difficulty.

The Witness is directed to withdraw.

MR. DANIEL NORTON, is called in; and Examined, as follows:

Mr. *D. Norton.*

686. *Chairman.*] WILL you state to the Committee what your business is?

I am a timber merchant.

687. In what part of London do you carry on business?

In the City Road.

688. Earl *Stanhope.*] For how many years have you carried on business?

This is my 42nd year.

689. *Chairman.*] Will you state to the Committee the general objections which you have to the 9th clause of this Bill?

Practically it would put a stop to our business, because timber is now used in such lengths that if we are confined to 25 feet in the daytime, we must do all our business early in the morning to get all the long timber out, which we

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cannot do; we send out long and short timber together, as our customers order it. We have had a great inconvenience from the City law, but we have put up with it; we have obviated the inconvenience by going round, which is very inconvenient; and, in addition to that, the City being a small space, it is only exceptional, but to make an exception into a rule would entirely destroy us. We should be entirely swamped in our business if we were hindered from sending out our orders as they came in. In addition to that all the builders want different sizes of timber at all times of the day, in their carts, which they send, and it would be impossible to send anything longer than 10 or 12 feet in a builder's cart, according to the law as it is here laid down. I cannot see how our business could be carried on if we were compelled to conform to all the usages here required, which, for timber 24 feet long, would take a waggon 18 feet long. I have never seen a waggon 18 feet long. I have seen the large furniture vans, but I could not suppose that it would be required to have such conveyances as those to send our timber about. I have heard of a waggon 10, 11, and 12 feet long, but I have never heard of a waggon 18 feet long. Timber carriages, perhaps, extend to 18 feet, and there is no possible mode of sending long timber through the street, except in a timber carriage; we could not send out a piece of timber 50 feet long under the proposed Bill.

690. Lord *Stanley of Alderley.*] How do you send it now?
Upon a timber carriage. To be shut out from the City, as we are now, is a great inconvenience, but if it was said, "You shall not send any of this timber out except in the morning," we could not do our business.

691. *Chairman.*] Do you, at present, practically send timber along any of the streets between London Bridge and Westminster Bridge, on the north side of the river?
I am situated in the City Road; perhaps I am an exception; most of the timber merchants live in the City; we could manage much better than they could. Instead of sending from the docks, I send up my timber to the wharf, and I load it from the wharf, and if I was required to load all the timber between one o'clock in the morning and ten, I could not do it.

692. Lord *Methuen.*] You have spoken of the builders' carts which come to you; what length of timber do you put on their carts?
Frequently from 30 to 35 feet long, and more than that occasionally; but that would be exceptional.

693. *Chairman.*] Can you give the Committee any idea of the average number of builders' carts which take timber from your premises?
I keep 10 carts. I cannot tell how many come in a day, but a considerable number; perhaps 50 to 100.

694. Lord *Stanley of Alderley.*] Does the canal come near your premises?
Yes, it comes alongside of them.

695. Do you not bring the timber from the wharves on the river up that canal?
Yes, we bring great quantities that way.

696. Then how would a restraint from sending it through the town interfere with that, as far as regards getting the timber to you?
It would not do so as regards getting the timber, but I have to send it out. We used to bring a great deal more from the docks by horses than we do now, simply because we cannot come through the City.

697. *Chairman.*] Can you point out upon this map the position of your premises?
(*The Witness points out the same to the Committee*).

698. Earl *De Grey.*] What is the name of the basin upon which you are situated?
The City-road basin.

699. Lord *Stanley of Alderley.*] Is it within the area of four miles?
Yes; so that I am caught entirely; I am fairly bound.

700. *Chairman.*] Supposing that, instead of having a radius of any number of miles, the clause were altered, and certain streets were scheduled along which

no

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no timber should be sent, those streets being some of the principal thoroughfares, do you think that your objections would then be met?

It would be very inconvenient. If any reasonable requirement were put upon us, we should be pleased to conform to it; we conformed to the City law, and that was very hard lines for us, but we could manage in that case by going round, and in other ways; but here we could not do so.

701. Why could you not?

We know that some of the main thoroughfares get blocked up; and from my impression, travelling about from place to place, it seems to me that it would not be half so bad if there were proper police regulations in those thoroughfares. I think that a great deal of good might be done; but still in those main thoroughfares, such as the Strand and Holborn, if there was a regulation of this kind, I do not think that we should object to conform to it, if the lines were positively named.

702. Lord *Stanley of Alderley.*] Will you tell us in what way the City regulations now interfere with your business. If I understand you rightly they do not interfere with you in the timber which you receive from the river by means of the canal?

Not in bringing timber to us, but in delivery by us.

703. Earl *Granville.*] What inconvenience have you felt from being obliged to bring your timber by canal, instead of by horses?

That is not very material.

704. Lord *Stanley of Alderley.*] Then in what respect can the City regulations affect you, except in sending out timber which you must convey in the City itself?

And through the City. We send great quantities there; if we send that way we send early in the morning, and when our teams come back we send them on the other journeys. If it was all under the same rule, when our teams came back they would be lying still all day in the stable, and our men would be idle.

705. If certain streets where the greatest traffic exists were pointed out, and you were prohibited from sending the timber along there, your district to all the north of London would not be interfered with at all. In what respect then would you be injured?

We send out a great many battens of 2½ feet by 7.

706. What is the length of a batten?

Thirty feet. In our own carts that 30 feet batten goes just over the horses' head, and he takes no more than 30 feet with the present carriage, whereas if we had a carriage made, we should not only have a carriage with two or three horses perhaps in front to draw it, but it would take considerably more room than it now does.

707. If the protrusion in front of the cart and behind were to be extended to 8 feet, would it not be sufficient?

Eight feet would not be enough.

708. What is the length of the cart?

Six feet; that would only be 22 feet.

709. Earl *Granville.*] What proportion of the timbers are longer than 22 feet?

Timber is much longer than it used to be. In all the houses which are built now they are very particular to have the joists to go right through the houses, from 25 feet to 42 or 43 feet, and the house is much stronger with joists running right through, with no joint at all, whereas if you put short deals or short joists in a house, the house is not reckoned so strong.

710. Lord *Stanley of Alderley.*] Is it not the case now that they make use of iron for those very long lengths?

Not generally, except in the case of public buildings. In the other buildings we seldom or never see any iron used. I never observed it, except in some of the public buildings where people do not regard expense; I think that we ought along these thoroughfares to be permitted to take our timber. In the case of a timber

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timber carriage which has timber on it 50 feet long, the greatest part of that length is carried over the horse, and we never have any accident with these timber carriages; and I never heard of an accident with them. I do not know why there should be more inconvenience with them than in any other trade, and I believe that that long timber traffic takes less room than the coal merchants' traffic.

711. Those large timber carts are the greatest obstruction to the street traffic; they are more difficult than anything else to turn, and they occupy more space?

Where they go straight ahead, they are no more obstruction than any other carriage.

712. Earl of *Lucan.*] If you cover the horse with the timber, I suppose that you have the same extent of timber behind?

Yes.

713. How many feet cover the horse?

It is according to the length of the timber; say that it is 50 feet.

714. You say that you are now in the habit of putting enough to reach the head of the horse?

Yes.

715. What is the length of that?

The carriage will be 18 feet; the centre of that is nine feet; and the centre of 50 is 25; deducting 9 from 25 leaves 16.

716. It would overhang by how many feet?

Sixteen. It would be 25 feet from the centre. A timber carriage is formed of two bolsters.

717. Supposing that you do not allow your timber to go to the head of the horse in a timber carriage?

It goes right over the horse and the shafts; it is completely covered over the horse's head, and it sometimes reaches to the head of the other horse. There is no possible way of getting long timber about London in any other manner; if you did so you must have the wheels 20 or 30 feet apart, or more; and if you did so about London you could not make it follow.

718. Lord *Stanley of Alderley.*] What proportion of your timber trade consists of these large lengths of 50 feet?

In all large buildings they want them.

719. I suppose that comparatively it is a small proportion?

It is a good proportion; when the joists are not very long it requires a great quantity.

720. It depends upon the quantity, but if it is a small quantity it can very easily be conveyed within these hours which are allowed?

Yes. In our case a large proportion of it is from 30 to 50 feet; the average length of our timber is, I should think, about 35 feet; 24 feet is considered short timber.

721. Earl of *Kimberley.*] How much would the hinder part of a piece of timber of this average length of 35 feet, project?

Supposing that the carriage is 18 feet long, of course the centre would be nine feet; if you divide the 35 feet by two, it gives 17½, and if you deduct nine feet from that, it will be 8½ feet.

722. If you were allowed eight feet, as was suggested to you, that would be very clearly enough; 8 feet 6 inches would meet the case of an average length?

That is, on a timber carriage; that would meet the case as far as timber was concerned, because a timber carriage is so extremely long in the body.

723. Then the difficulty in that case would be reduced to deals?

Yes.

724. Deals project very much further?

Yes, because the cart is short.

725. What would be the average length of deals?

We group from 12 to 30 feet, and sometimes more; but it is exceptional beyond that. We have a great quantity of deals from 22 to 28 feet.

726. What do you say would be the average?

I should say that between those figures would be the average.

727. Lord *Stanley of Alderley.*] Twenty-five feet?

Yes; about that.

728. Earl of *Kimberley.*] How much would that length project beyond the cart?

Eight feet six inches, at each end.

729. So that when we mentioned eight feet, we very nearly gave sufficient length for the average deals and the average timber which you carry?

Yes, but that is only on the average of the length.

730. Lord *Stanley of Alderley.*] If that was the average which you would be allowed to carry at all times, you would only be obliged to carry early in the morning the greater lengths; and could you not divide your trade in that way?

In the City we are excluded, and the ground is pre-occupied by the City, because, if we cannot send through the City we are obliged to send all the long lengths to other places.

731. I suppose that the greatest part of this traffic is in timber which is used for new buildings?

It goes to all kinds of people, engineers, builders, box-makers, and every possible trade requiring timber come to our place.

732. Box-makers do not take great lengths of timber?

I admit that. The Baltic trade has changed considerably in the last few years; where we used to get 14 feet we now get 28 feet, 32 feet and 33 feet, there being no duty upon it; but in the Quebec trade, the spruce and pine, they are confined to short lengths. Then we could not do our business in the dark; it is impossible to go to these deal piles and load in the dark; it is now a most dangerous thing in the light; three or four times in the year we have men who break their legs, and so on, which I am very grieved at, but which we cannot prevent; it has generally occurred when they have worked when it has been a little dusky.

733. Do you get your timber from the Surrey Docks?

Yes.

734. Is not most of that timber taken to your premises by the Surrey Canal?

Yes, and then they land it and load it; we could not do it in the dark without very great danger. I do not think anything impossible, but at the same time I know that it is very dangerous.

735. In what way would this Bill affect the transit of timber from the Surrey Docks to your premises by the Canal?

I can bring it by Canal at any time.

736. Do you not generally bring it by Canal?

We have a great many orders which we are obliged to execute from the stock at the Docks, and we have to send to different customers direct from the Docks.

737. Lord *Methuen.*] They send to you three or four times in a day?

Yes.

738. Why cannot you send them this long timber early in the day?

If a customer sends to us we cannot help ourselves in the matter.

739. Could not you make an arrangement with your customers in that respect?

Dictation of that kind to our customers they do not like at all; we must attend to our customers; there is no mistake about that.

740. Lord *Stanley of Alderley.*] If your customers cannot get the timber at any

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any other hour, I suppose that they will get it at the hour when they can obtain it?

I should have to stand the racket of it.

741. Earl of *Kimberley.*] Would there be any difficulty in your customers making an arrangement with you, by which they should receive their long timber in the morning and their short timber later in the day-time?

They come from Middlesex and London at all times of the day; we cannot tell who they are.

742. Supposing that the law did not allow them to receive the long timber during the day, would it be impossible for them to make arrangements so as to take the long timber in the morning?

I have admitted that nothing is impossible; and if it is the law I must obey it, but I should certainly back out of the timber trade.

743. Would it be such a serious inconvenience as to damage the trade?

It would be quite impossible with our journeys; we could not take them with long timber.

744. Lord *Stanley of Alderley.*] Has the City bye-law stopped your trade in the City; has it prevented you from serving customers in the City?

We send there early in the morning now, but if that was multiplied, I do not see how we could do it. We do it now because it is exceptional.

The Witness is directed to withdraw.

MR. JOHN BULMER, is called in; and Examined, as follows:

Mr. *John Bulmer.*

745. *Chairman.*] ARE you engaged in the timber trade?

Yes.

746. Will you tell the Committee where your place of business is situated?

At Rotherhithe, near the Commercial Docks, within the radius.

747. Will you state to the Committee shortly how the 9th clause of this Bill, supposing it to become law, would interfere with your trade?

We think it would entirely prevent us executing our orders, in consequence of the length being confined to 25 feet, and the hours of delivery to the period between 7 in the evening and 10 in the morning. We should have to start very early in the morning from our premises to go to the extreme limit, as it would be almost impossible to do it from our works, unless we started before midnight.

748. When do you start now?

At all hours in the morning; usually at 5 or 6 o'clock.

749. If you sent timber from your premises to the west end of London, should you go through the streets on the north side of the river, or should you go along the south side of the river?

On the south side, most likely, if sending westward.

750. So that, in point of fact, as regards the conveyance of your timber westward, a provision that would prohibit your going along such thoroughfares as Holborn or the Strand would not interfere with you. If you were sending goods to the railways on the north of London, you would not want to go along those thoroughfares, but to cross them?

Certainly.

751. Lord *Stanley of Alderley.*] When you say that if you were only allowed to carry timber of a length of 25 feet it would cut up your trade, what extension of length that you might be allowed to carry do you think would meet your difficulties?

I think we should be allowed 35 feet.

752. You do not think 30 feet would be sufficient?

It would be much better if it were 35. Then eight feet is not enough to allow in front. In loading a timber carriage, it is necessary that the timber should project more over the horses' heads than behind. We have what we term a bolster to take it over the horses' heads, and we are obliged to put it forward to balance the load.

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753. Would not it be possible for you to confine your delivering of the great lengths to the earlier hours of the day, delivering the smaller lengths during the middle of the day?

I think not. We employ at times 135 horses, and we have large orders from contractors and railway works, special messengers coming down daily for particular lengths, which are wanted in a great hurry.

754. The demand for the great lengths is smaller than for the other description of timber, is it not?

As a whole, certainly.

755. Would the demand for timber of the greater lengths be more than you could supply within the early hours?

Decidedly.

756. *Chairman.*] If you were sending timber from your premises to the Great Northern Railway, which way would you go through the City?

We should send it most likely over Southwark Bridge. It would be utterly impossible that we could carry on our business with these restrictions.

757. Lord *Stanley of Alderley.*] You mean if those restrictions were universal?

Yes.

758. Would it be equally so if those restrictions were to be limited in their operations to a certain number of the great thoroughfares of the town?

It would facilitate our operations, certainly, if they were so limited.

759. Such an arrangement would diminish your objections, but would not entirely remove them?

Quite so; we submit that the limit ought not to be less than 35 feet for the length of the timber instead of 25 feet, and that we should not be limited to 8 feet for the projection before and behind, inasmuch as we require a greater limit than 8 feet in front. We are obliged to put the timber forward over the horses' heads in consequence of the carriage being sloping.

760. *Chairman.*] Supposing the 8 feet limit applied only to the hind part of the carriage, it would not interfere to any greater extent with the traffic if, instead of it being 8 feet in front, it were 10 or 12 feet, because it would be over the horses' heads.

Quite so.

761. Lord *Stanley of Alderley.*] Is your timber carried on two-wheeled carts?

Four-wheeled. If this were to become law we could not do anything at all with regard to delivering goods; we should not be allowed within the radius to bring a carriage out at all. Persons send from all parts of London for timber from our premises, and in the dead of the night it would be most awkward to deliver the timber.

762. Would it seriously interfere with your trade, if the carrying of those large baulks were prohibited altogether, except in early hours?

It would certainly affect us very much.

763. But the proportion of those large baulks is small compared with the timber of smaller dimensions?

Quite so.

The Witness is directed to withdraw.

Honourable ASHLEY PONSONBY, is called in; and Examined, as follows:

Hon. *A. Ponsonby.*

764. *Chairman.*] WILL you state in what capacity you attend before the Committee?

As Chairman of the District Board of Works for Westminster, and as one of a committee which was called together in the late heavy fall of snow, to take measures with a view to its removal. I come before the Committee to give evidence,

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evidence, not hostile to the Bill, but with the hope that a few alterations may be made in Clauses 5, 6, 7, and 18.

765. Will you inform the Committee what part of London is comprised within the jurisdiction of the Westminster Board of Works?

We take Westminster, extending just over Vauxhall Bridge-road; we go along Whitehall as far as the middle of the Horse Guards; we skirt the Park as far as Buckingham Gate; and we take Knightsbridge-road and Kensington, as far as the Palace Gardens.

766. How many parishes?

Two; St. John's and St. Margaret's, Westminster.

767. Will you state what alterations you would propose in Clauses 5, 6, 7, and 18?

In the first place, with regard to Clause 5, a great part of our district is a low neighbourhood, and there is not a large traffic in the smaller streets. With regard to Rutland Gate and Prince's Gardens, there is not much traffic in that district, and it would be extremely inconvenient for the proprietors of houses in that district, and for their servants, to have the ashes, dust, and refuse removed early in the morning, necessitating the unlocking of the area gates; and, also, in the low districts it would be objectionable for the same reason; it would be very inconvenient for people to get up at those early hours. Then, also, with respect to the removal of mud and dust from the roads, Parliament-street, Bridge-street, and Whitehall have to be cleansed twice a day, and very often Victoria-street has to be cleansed twice a day. In the case of a frost succeeded by a thaw, macadamized roads become in such a state that, if they were not immediately watered, and scraped, and swept, they would be broken up by the wheels of carriages. As Clause 5 stands, we should require to have numerous streets scheduled; whereas we should propose, if it could be conveniently done, that all the words after the word "evening," as far as "Police," should be struck out, and then at the end of the paragraph, after the word "street," the words "disallowed by the Commissioner of Police from time to time" should be inserted, which would give him the power at any time to inderdict the removal of mud, dust, ashes, or refuse from any street: the clause would read thus, "within the limits of the first part of this Act, no person shall, between the hours of 10 in the morning and seven in the evening, remove any ashes, dust, or refuse from any house, or sweep or clean any streets, or remove any mud, litter, or other refuse from any street disallowed by the Commissioner of Police." Then, with regard to Clause 6, as I have already stated, in the district about Prince's Gate and Prince's Gardens, the traffic is not sufficient for coal waggons to cause any inconvenience at all; therefore we would suggest that the clause should stand in this way: that the words "back streets or other bye-ways" should be struck out, substituting the word "streets," the clause reading as follows: "No coal and no casks, whether empty or full, shall be loaded or unloaded on or across any footway within the limits of the first part of this Act, except between the hours of 1 and 10 o'clock in the morning, or in such streets as may be approved by the Commissioner of Police." That would enable us to have our coals and things delivered in places where the traffic is not great.

768. Would there be any great difficulty in having ashes, dust, or refuse removed at an early hour of the morning?

I must refer you to our surveyor for details, but I believe the difficulty would be that we never could tie the contractors to any particular hour in any particular district; they would come perhaps at 2 o'clock in the morning and ring the bell, requiring the area gates to be opened, and causing a great deal of inconvenience.

769. Do you think that that inconvenience is greater than the very great inconvenience caused by the removal of ashes, to every person who passes by?

I do not propose to do away with the prohibition altogether, I would only put it in the power of the Police Commissioner to decide in what streets it might be done. With regard to Clause 7, we perfectly agree with that, except that the words "for a longer time than may be absolutely necessary," leaves it too open, and we would suggest whether some such words could not be put in as were in the City Bill. Twenty minutes only might be allowed, except with the permission of the Commissioner of Police. That is a matter of no great importance.

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770. Will you state what modification you would propose in Clause 18?

Your Lordships no doubt remember the great inconvenience that was felt by everybody by the heavy fall of snow which we had in the beginning of this year. Our District Board called a committee, of which I was chairman, to try to take means for doing away with the nuisance. We went and saw all the different bodies who we thought could help us: we first went to the Home Office, then to the Board of Works, and then to the Thames Conservancy; but by the Act of Parliament, I believe they could prevent us throwing snow into the Thames. The difficulty of carting snow, is immense, as you may suppose; nobody likes a pile of snow put anywhere, and if we attempted to put it on any vacant space, we should be noticed off directly. If we had power to put down the snow in certain broad thoroughfares, and if we were also allowed to employ steam power, if necessary for the removal of the snow, it would be a great public convenience. Then it appears to us that it would be very desirable to make an alteration in the clause in this respect. As the clause at present stands we are at the mercy of any common informer, for it is tantamount to that. If, instead of its being left in the hands of any common informer, it were to be placed in the hands of the Commissioner of Police, and if he were to be empowered to take action after due notice having been given to the street authority that would be a great improvement. Of course district boards have many enemies among people who have nuisances, and things of that sort, and there is nothing that they would like so much as perpetually summoning our officers on the most trivial cases, by which a great deal of harm would be done to the authority by which we act. To be perpetually brought before the police magistrate would be very inconvenient in many respects. We should propose to raise the fine considerably, and strike out the words "in any street," substituting the words "from their district," so that the clause would read, "if any street authority make default in removing the snow from their district, with such practicable speed as aforesaid, they shall be liable to a penalty not exceeding 50 *l.*," or any sum your Lordships may think it fair and proper to insert; and then we should propose that the prosecution should be carried out by the Commissioner of Police, after having given the street authority notice. That mode works very well in the case of the Ruinous Buildings Act. There are very few complaints of the working of that Act; the police come and find that a building is in a ruinous state, whereupon they give notice, and the work is done. A similar provision with regard to the street authority, in the case of snow, would take away the odium of being perpetually summoned on small occasions.

771. Would you propose that the police, in the event of a heavy fall of snow, should go and give notice to every street authority?

No. The clause at present stands thus: "Whereas it is expedient to make further provisions for the removal of snow, within the Metropolis, be it enacted that every street authority shall with all practicable speed remove any snow," so that in fact this would hardly work because the street authority would put on a certain number of carts and horses, and it would be only putting them at the mercy of a common informer; whereas if the Commissioner of Police sent a police serjeant he would see whether the parish were doing what they could or not.

772. Earl of *Kimberley.*] Are you aware that in the country districts there is a summary power of calling upon the surveyor to clear the snow away?

Yes, but it is very rarely enforced, and it is extremely easy in the country to remove the snow. In London we have no places to take it to.

773. Is not the great object to put the street authority in motion?

We act directly; we begin as soon as we possibly can. In all contracts the contract with the contractor is that he is to do it. When he showed his utter inability to cope with the fall of snow in January, we immediately met and took action instantly, and were most energetic in our endeavours to get rid of the nuisance.

774. Lord *Stanley of Alderley.*] What is the Act of Parliament prohibiting you from putting snow into the river?

I believe it is the Thames Conservancy Act. We want permission to pile the snow up in heaps round the squares, for instance, and we did pile it up in Portman-square, but we were informed by our solicitor that we were liable to

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an action for doing so. We wish that instead of proceedings being initiated against us by a common informer, it should be done by the Commissioner of Police, and then we should also desire, if such a power could be introduced into this Bill, that we should be allowed to use steam rollers, and stop the streets while using them. We cannot use steam rollers under the existing Acts, and we should desire to have the power of using them without going to the Metropolitan Board, and in case of the use of those steam rollers, to be able to stop certain streets during certain hours. The traffic would require to be stopped during the time that those rollers would be used, for the noise which those rollers make is immense. If a clause of that sort could be introduced into the Bill giving us that power without going to the Metropolitan Board it would be a great boon to the public. We should also propose another clause making it unlawful for people to sweep dust and refuse into the streets. At all hours in the day they throw oyster shells and all sorts of things into the streets, rendering it impossible to keep the streets clean.

The Witness is directed to withdraw.

Mr. ROBERT RICHARD ARNTZ, is called in; and Examined, as follows:

Mr. *R. R. Arntz.*

775. *Chairman.*] You are Surveyor to the Westminster District Board of Works?

I am.

776. Have you any modifications to propose in Clause 5 and Clause 18?

Yes. First as to Clause 5: as that stands at present it prohibits the cleansing of the streets between the hours of 10 in the morning and seven in the evening. If that be retained it will operate to prevent the effectual cleansing of certain of the streets to a very serious extent, and I would instance the case of such streets as Whitehall, Parliament-street, Bridge-street, Great George-street, Broad Sanctuary, Victoria-street, and say the Kensington main road, all of which the Westminster Board has cleansed before 10 o'clock in every morning; but they have found it necessary at times to have them cleansed a second or even a third time, and the reason for that is this, they are macadamised roads, and macadamised roads in certain states of the weather may be perfectly clean in the early part of the morning, but may become exceedingly dirty, and almost, I was going to say, impassable in a later part of the day, and that from this cause: take the case of a frosty morning, Whitehall, for instance, will be set perfectly hard; you will hardly get a barrow full of dirt from the surface at 10 o'clock, but as the morning goes on, say by 12 or 1 o'clock, the frost may give way, and then the street becomes in that condition which those who are practically engaged in these matters call a licky state; the mud becomes sticky, the carriage wheels draw the stones out, and the road becomes broken up. The only remedy for that is to apply water and to sweep the surface. If that were not done, and done on the spur of the moment almost, very serious inconvenience would result to the traffic, and, from the breaking up of the road a very large cost would be incurred in repairs. That is a serious inconvenience which applies to macadamised roads only; it does not apply to paved streets, therefore, it would be very convenient that macadamised roads, at any rate, should be left in the hands of the authorities for after-cleansing if necessary.

777. You see no objection to limiting the hours during which paved streets should not be cleansed?

I see no objection to limiting the hours in which paved streets should not be cleansed so far as any practical difficulty goes. Take, for instance, the Strand; the Strand, if properly cleansed in the early part of the morning, would not, I dare say, become in a condition in the course of the day to render it necessary to cleanse it a second time. I dare say it would not, though it would be better to have the power to cleanse the streets again in the course of the day if it were necessary; but in macadamised streets, very serious inconvenience would result from the restriction, that is so far as breaking up goes. As a matter of economy in working, it is very essential that there should be power to cleanse the inferior streets many times in the day. There are many streets as to which in respect of interruption to traffic it is unimportant whether they are cleansed at one time or the other; and, as a matter of economy it would be very

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very desirable that the power to cleanse those streets at any time in the day should be retained. We think that the terms of this clause should be reversed, and that the Commissioner of Police should have the power to designate the streets where cleansing should be prohibited during the specified hours; and I would suggest that the restrictions should be limited to paved streets, not extending to macadamised streets. As to dust, I do not think I need trouble your Lordships upon that subject. Mr. Ponsonby stated the inhabitants' inconvenience. I do not know that the Board desire to urge anything to your Lordships upon that point, except as it affects the economy of working; the cost would be increased by every limitation.

778. Lord *Stanley of Alderley.*] Would it not be sufficient to meet the difficulty you feel on Clause 5, with regard to macadamised streets, merely to leave it to the approval of the Commissioner of Police to designate such streets as should be allowed to be cleansed after 10 in the morning?

I hardly think so, because he would have to except the streets that might be permitted to be cleansed. I think it would be enough that he should have power to indicate those in which cleansing should be prohibited.

779. You think that rule of yours should apply to every macadamised street, whether with much or small traffic?

Yes, for this reason, unless in streets of large traffic, it is totally unimportant whether they be cleansed at one hour in the day or another. Mr. Ponsonby suggested that persons should be prohibited from sweeping house refuse into the streets, or depositing oyster shells or refuse of any kind upon the streets; such a prohibition would be a very desirable enactment.

780. *Chairman.*] Is that done much in the Westminster district?

Yes, it is a serious evil; and it is still more important to prohibit such a practice if you place restrictions of any kind upon the hours during which the scavengers may work, because otherwise a street may be cleansed, say before ten, and at half-past ten all the shopkeepers in the street may sweep out their refuse, and very serious evil may result.

781. Have you any observations to offer upon Clause 18?

Passing to Clause 18, I have chiefly to draw your attention to the large amount of penalties. As I read the clause in the Bill, in the Westminster district alone fines to the extent of somewhere about 2,000 *l.* per day might be inflicted. That would be a very monstrous sum, and I dare say more than your Lordships have thought of placing it in the power of any one to impose.

782. Lord *Stanley of Alderley.*] How would you propose that the street authority should remove the snow in cases of very heavy falls taking place, such as that of last month?

One way would be to heap it up in a large space, such as Whitehall, piling it up in the centre of the street, leaving two lines for traffic. Another way would be to clear a drift down to the river side, and cast the snow into the river.

783. The preceding witness has stated that there is an Act of Parliament against throwing snow into the river; are you aware of the existence of any such prohibition?

It is not prohibited in terms, but the Act of Parliament, after reciting all manner of things, says, "or any other matter," and snow would come under that head; therefore it is prohibited. But the Conservancy Commissioners have now given to the Westminster District Board permission to cast snow into the river, provided it be clean snow. But I wish to point out, that if the authorities are to be subject to these heavy penalties; and, under any circumstances, if the feeling be that these things should be done, Parliament must be good enough to give them every possible facility, and every possible protection; they must not be in the hands of the Conservancy Commissioners, or any other body, at a moment to withdraw the power to get rid of the snow, and therefore to disarrange whatever plans they may have adopted.

784. Would that plan which you have proposed of heaping up the snow in the centre of the street be available in the case of a narrow street?

No, it would not.

785. It would only be capable of application to large streets like Portland-place and Victoria street?

It would be difficult even in Victoria-street.

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786. Lord *Methuen.*] That method could be adopted in any street large enough to have a cab-stand, could it not?

Hardly, because you must have a double line at least for carriages.

787. *Chairman.*] Would Mr. Ponsonby's suggestion meet your view, that instead of having a fine for each street separately, there should be a fine of 50 *l.* for the whole district?

I think it would; I think it would have a very bad effect if the clause were to stand as it does; that the authority which should be looked up to with a certain amount of respect should be liable to a fine of this kind, and to be brought before the police magistrate, just as any other wrong doer might be.

788. The fines would be paid out of the rates, would they not?

I should hope so.

789. Earl of *Kimberley.*] Would not it be cheaper to pay a fine of 50 *l.* than to remove the snow?

Possibly it would be so.

790. Is not it obvious that, in order to make the law efficient, the fine must be such that it would cost the parties more to evade performing the duties?

If they are to be regarded as contractors, and if it is to be supposed that they would seek to evade the law in that way, the proper course would be to take it out of their hands altogether, and place it in hands more immediately under control. What I venture to suggest is this, that it should not be a fine for every street and every place, but that if in the opinion of the Commissioner of Police a local authority be neglecting its district altogether, taking a view of the whole, that they have not done that which they should have done, he should have the power of summoning them before a police magistrate, and that then a fine of 50 *l.*, 100 *l.*, or 500 *l.*, if they think fit, should be imposed. They ought not to be liable to be harassed by petty attacks of this kind, but to be treated as an authority entrusted by Parliament with certain powers.

791. Earl *De Grey.*] Is there any precedent for giving the Commissioner of Police that sort of general supervision over the discharge of a particular duty by a local authority?

None; but I suggest it because I take it to be the view of your Lordships that there should be some such power.

792. Earl of *Kimberley.*] Do you object to that part of the clause which enables any person, on default of the local authority, to have the snow removed, and charge the expense to the Board?

Yes; I think all action against the authority should be by the Commissioner of Police.

793. In fact, you would rather prefer that we should have entire confidence in the authority, and not enact anything harsh or compulsory against them?

I do not think that is the drift of my suggestions at all; it is not the intention of them, at any rate; but if you entrust the authority with the duty, it is only fair to assume in the first instance that they will perform the duty.

794. But supposing they do not perform the duty, is not it fair to allow those who are aggrieved by its not being done, to do it and charge the expense to the authority who ought to have done it?

I would give the same power of action in that respect that is given to a person in the case of a ruinous building; he does not find any difficulty through the police, in getting a ruinous building destroyed.

795. *Chairman.*] Is not there this distinction between the case of snow, and the case of ruinous buildings, that in the case of snow you want to act immediately, or as soon as possible, whereas in the case of a ruinous building the necessity of action is not so urgent?

Very frequently in the case of a ruinous building there is scarcely an hour to be lost, for life may be at stake.

796. Is there any other point which you wish to bring to the attention of the Committee?

With respect to the question of places for the deposit of snow, to which Mr. Ponsonby has already referred, we should have power to cast it into the Thames, or to deposit it in the parks or any other open spaces that may be available; and

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and generally, I think, it would be very convenient that we should have a power that is given to railway companies in almost every Bill that is passed, a clause giving the authorities general power to do whatever may be necessary to the end to be accomplished; that is to say, that we should have power to deposit snow so and so, stating certain specific things which we may have the power to do; and then to do all other acts that may be necessary to attain the object. What I wish to urge upon your Lordships is this, that if you impose a duty you should, as far as possible, give the necessary powers for discharging the duty.

The Witness is directed to withdraw.

MR. WILLIAM HOWARD, is called in; and Examined, as follows:

Mr. *W. Howar*

797. *Chairman.*] You are a Cab Proprietor, I believe?
Yes.

798. How long have you been in the trade?
Eight years.

799. What were you previously to being in the cab trade?
I was an inspector of public carriages under the Metropolitan Police.

800. Will you explain to the Committee how you consider the traffic is impeded by cabs at present?
It occurs to me that the great evil is this, that the railway companies will not allow cabs to ply from their stations except those that are licensed by them; supposing, for instance, a cab goes from the Great Western Station to London Bridge Station, directly it has deposited its fare the cab is turned away to wend its way back through the City. The railway authorities will not allow the cab to take a fare up at the London Bridge station, so the cab goes back crawling along, avoiding the police (whom the cabmen regard as their natural enemy), and obstructing the traffic. That cab returning from London Bridge will perhaps meet another coming from the Great Western terminus, where, in like manner, it has been prevented from taking up a fare, so that there are two cabs obstructing the traffic, and neither of them having a fare.

801. You think if the railway companies would give up their privilege of licensing cabs to ply for hire in their stations, a good deal of the passage of empty cabs through the streets would be avoided?
No doubt of it.

802. Earl *Granville.*] Do the companies derive a revenue from the licensing of those cabs?
Yes; I apprehend that the revenue derived by the railway companies from cabs would amount to half the duty which the companies have to pay.

803. Lord *Stanley of Alderley.*] How much do the cabs so licensed pay to the railway companies?
Every cab pays 6*d.* a day. We do not want to deprive the companies of the revenue which they derive from the cabs, we only want them to do as the London and South Western Company do. At the terminus of the London and South Western the cabs only pay one penny, and if that charge were adopted by the other railway companies, I think there can be no doubt that they would not lose in a financial point of view. I think the South Western Company receive 800*l*, a year by the pennies.

804. Earl of *Lucan.*] Is the London and South Western Railway Company the only company which allows any cab to ply for hire in their station on payment of one penny?
That is the only one.

805. The other companies only allow their own licensed cabs to ply for hire in their stations?
Yes.

806. Earl *Granville.*] Is there any pretence of supervision on the part of the railway companies; is there any examination by them of the vehicles to see that they are in good order?

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No; if there is any such supervision it is of a very peculiar kind, for those cabs are really in some cases what they ought not to be.

807. Lord *Stanley of Alderley.*] Is there any deficiency in the supply of cabs at those railway stations?

Never.

808. You see no difference in the supply of cabs at the railways where they prohibit any cab coming except those which they license, and at the South Western, where any cab is allowed to come, on payment of a penny?

There have been times, at the Great Northern and the Great Western, when there have not been enough cabs, but generally there are plenty of cabs.

809. *Chairman.*] Have you any other suggestion to make to the Committee, with respect to that part of the Bill which relates to cabs?

With respect to the lamp, which is required by paragraph 2 of clause 17, we thought at first it was to be placed inside the cab, but since we have understood that it is proposed to be placed outside, we do not object to that requirement.

810. Lord *Stanley of Alderley.*] The Hansom cabs carry a lamp now, do they not?

Most of them do I would, in connection with the lamp question, make this suggestion, which I think, in practice, would be for our benefit, and for the benefit of the public likewise. If the cabs of the North London District carried, say a red light, those belonging to the South London District a white light, those belonging to the east a green light, and those belonging to the west a blue light, any one wishing to hire a cab would be able at once to select a cab belonging to his own neighbourhood. For want of this means of distinguishing cabs one of my cabs might be taken from the Princess's Theatre to Brixton, for 2 *s.* 6 *d.*, and have five or six miles to come back. If a man wanting a cab saw a cab bearing a red light, he would say, "That cab is going my way home," and he would hail it at once. This last summer, in consequence of a cabman being taken at dark into Battersea Fields, with which locality he was not acquainted, the cab was thrown over, and the passengers were injured. If such a plan as I suggest were adopted, anyone wanting to be taken to his own locality by a cab would have no occasion to speak to the cabman, because he would know by the light that he was going to the same locality.

811. Lord *Methuen.*] You would have the number of the cab on the lamp?

The number might be on the lamp if you pleased; the regulation as to the giving of a ticket might remain as it is.

812. Lord *Stanley of Alderley.*] Do you think that the proposition of making the minimum fare 1 *s.*, instead of 6 *d.*, would be acceptable to the cab-owners and advantageous to the public?

Individually I would like the fares to remain as they are. The question has been discussed at a meeting of nearly all the respectable cab-proprietors, who deputed me to represent them before this Committee. I said, "Let the fares remain as they are; in the Exhibition year they paid us very well." The fault is not that we do not get paid for our work; the fault is, that we are met by the competitions of persons without any principle. Those cab proprietors who have capital cannot compete with those who have none. A man vends rabbits in the winter, and in the summer he will take our a license for a cab. Those men are men of no principle, and if luggage is lost in their cabs, the chances are that it will never be recovered.

813. Do you think that if cab proprietors were allowed to charge a higher fare for a better class of cab they would be induced to introduce such vehicles?

I am deputed by the cab proprietors to say that we think plenty of good cabs would be provided if the law were left as it is, if, at the same time, our property were protected to a certain extent. We ask that we should have a fair chance with the men of no capital. A coalheaver or a marine store dealer will in the summer time come in the streets with a cab, and he will take care to keep clear of the police, and if anything is left in his cab it will never be given up.

Mr. *W. Howard.*

25th February 1867.

814. How would you propose to remedy that?

I would propose that whatever duty we pay to the Government we should pay it all at once, and in advance, for the 12 months; I think we ought not to pay more in proportion than the omnibuses do; the omnibuses pay about 3 *d.* a day.

815. You wish that the license and the tax should be for the whole year, and not for a limited period?

Yes.

816. Earl of *Lucan.*] You object to the system of licensing cabs for the season?

Yes.

817. Lord *Granville.*] If the tax were an annual tax should you increase the number of your own cabs in the summer?

Directly, because then I could compete with those men to whom I have referred. At present in the summer time we cannot compete with them, because they pay nobody; they will go away without paying their rent, or their corn dealer, or for the hire of their cabs; such men as those will go away with a person's luggage, and never restore it. With respect to the question of our liability for luggage left in cabs, we have three actions now pending, and we shall be only too glad to compromise them, paying the parties anything we can in order to arrange them. As the law now stands, it is calculated to shut every man of capital and standing out of the business.

818. *Chairman.*] You wish that your liability for lost luggage should be limited?

Yes, it would be most desirable; and, unless it is done, I do not see how the trade is to be carried on. Mr. Nunn, of Dorset Mews, Dorset-square, probably the most respectable man in the trade, who has, perhaps, 100 horses, said to me the other day, "I shall not be able to stand this much longer." Mr. Wright, our solicitor, has a case now in hand where a lady has brought a claim for the loss of her luggage. At first, she says, the value of it is 14 *l.*, that would seem to be rather a large sum; but a few days afterwards, when she finds how the law stands, she says the value is 30 *l.* Then she meets with an unprincipled man (whose name is certainly in the law list) who takes up the case, and now the claim is 50 *l.* All that parties have to do is to make themselves quite sure that the luggage is gone, and then make any demand they please. We have to pay, and we cannot help ourselves; we are not on the same footing as railway companies and innkeepers. We will find plenty of good cabs, and take the fares you specify, only give us some protection against persons who make those demands.

819. Earl of *Kimberley.*] You want to be put on the same footing as common carriers?

Yes; with the same liabilities.

820. Lord *Stanley of Alderley.*] Do you think that if a higher fare were allowed to be charged for a superior description of cab, it would be an inducement to cab proprietors to put on that better class of vehicle?

I am quite certain that it would stop the streets of London up more than now.

821. Why?

Because many more things would come out if the law were not altered.

The Witness is directed to withdraw.

Ordered that this Committee be Adjourned to to-morrow, at One o'Clock.

Die Martis, 26° *Februarii*, 1867.

LORDS PRESENT:

Earl of AIRLIE.	Earl de GREY.
Earl STANHOPE.	Earl of KIMBERLEY.
Earl of LUCAN.	Lord METHUEN.
Earl of BELMORE.	Lord STANLEY OF ALDERLEY.

The EARL of BELMORE in the Chair.

Mr. WILLIAM HOWARD is called in; and further Examined, as follows:

822. Earl *Stanhope*.] IN clause 17 of the Bill, it is proposed to insert the following Provision: "No fare less than the sum of 1 *s.* shall be payable to the driver of any hackney carriage drawn by one horse, and where, previously to the passing of this Act, less than that sum would have been payable, 1 *s.* shall henceforth be paid;" that is to substitute for the first hiring 1 *s.* instead of 6 *d.*; what is your opinion of that provision?
We are well content with it.

823. You think that it would be an improvement?
We do.

824. Is it the fact that in most cases 1 *s.* is received now, or is 6 *d.* occasionally received?
In nearly every case 1 *s.* is received, but this provision would do away with the unpleasantness which takes place with a cabman as to whether he ought to have 1 *s.*, or is entitled to it. We suffer nothing from the present law in that respect, or very little.

825. You therefore, think, that this provision would be advantageous?
It would.

826. Do you see any objection to the second article in this 17th clause, namely, that the driver should be required to have at least one lamp intended to be outside?
No, we have no objection to it on the outside.

827. Do you think that it would be a security?
It would be a security to the passenger and would be useful to us, inasmuch as it would protect our property from being run against, and would probably protect us in a great many other ways.

828. Earl of *Lucan*.] Where would you put the lamp in a four-wheeled cab?
I have not yet considered that point; but I do not think that it could be better than as it is placed in a brougham.

829. Could not it be placed in the centre of the carriage?
The driver would be in the way of it, sitting in front of it; and he would obstruct the view of the public.

830. Lord *Stanley of Alderley*.] Could not it be elevated above the head of the driver?
The luggage would interfere with it, and it would be broken.

831. Earl of *Lucan*.] Could not it be placed before the driver on the splashboard?
No;

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No; I should suggest its being put on the left or near side of the carriage where persons get in and out, and also away from where the driver sits, and very nearly in the same position as that in which it is fixed in a brougham.

832. Earl *De Grey.*] You say that you scarcely ever receive 6*d.* for the first hiring?

Scarcely ever.

833. When people take a cab for a very short distance, for instance, in returning from church on a wet day near their own home, or anything of that kind, are there no persons who give a sixpenny fare?

That is just the very time when we get the 6*d.* A man said the other day, "Though I had only 6*d.* yet I got it five times within the hour, and I made my 2*s* 6*d.*" That occurred a few Sundays ago.

834. On occasions of that sort, you do receive the sixpence?

Yes; and beyond that I think that it affects us very little.

835. Earl *Stanhope.*] Supposing that a superior class of cab were established for those persons who were disposed to pay more, do you think that the interests of the cab proprietors on their present footing would suffer?

Not at all.

836. They would still have sufficient employment from those persons who wish to pay a smaller sum?

I think that they would.

837. *Chairman.*] In fact, I suppose, that the class of persons who now use broughams from livery yards, would be the persons who would use a superior class of cabs?

I should think so.

838. Will you take this copy of the Bill and read the Amendment of paragraph 5 in clause 17, which is written in red ink?

If I read it correctly, I apprehend that it will do away with that part of the provision which empowers the police to take the carriage and horse away.

839. That paragraph 5 as amended is intended as a substitute for the part which would require the police to take the carriage before a magistrate?

Just so; I do not see any very material difference in it from the arrangements which are now made, so far as I can read it.

840. Paragraph 5, as amended, will read thus: "The said Commissioner may from time to time cause to be affixed such plate or mark, in such position as he thinks expedient, to any hackney carriage certified by him to be in a fit condition for public use, and may remove such plate or mark whenever such carriage has been determined by him to be in a condition unfit for public use; and if any carriage shall be used for the purpose of standing or plying for hire, as a hackney carriage, not having such plate or mark affixed thereon in such position, as shall be directed by the said Commissioner, the driver of such carriage or person plying for hire therewith, and, if not, the owner, shall be liable to a penalty not exceeding 40 *s.*, and the owner of the carriage shall be liable to a penalty of 3 *l.* for each day that such carriage shall be used not having such plate or mark affixed thereto." I understand you to think, that that would not be any very great change in the existing law?

It would not be any change, because if an owner now, after notice, uses his carriage, he is liable to a penalty of 3 *l.* a-day for each day that he uses it. In this case it would do very well, and we should be well content with it. The taking of the cab to the Green-yard would be, in our opinion, preposterous, because we might send our cab clean from home in the morning, and the man might be driving all day, and he might pick up some person with a wet mackintosh, or a lady with a wet cloak, who might leave some dirt in the cab; he is put on the stand in Oxford-street, and he is not there 10 minutes before he is covered with mud, and the police may see the cab very dirty and damp inside, and it is taken away without any ceremony; we have no chance.

841. Are you aware whether, in some cases, after the cab has been certified by the person whose duty it is to certify it as fit for public use, it is exchanged for another cab which is not fit for public use?

When I read the address which was given at the Society of Arts, I found that the person was entirely in ignorance of the practical working of the whole affair. If it is so it is an isolated case: when I was inspector of carriages I had from 1,300 to 1,500 cabs, and I thought at that time that no one would get the best of me very well, and I do not remember a case of its being done; if it is done it is entirely the fault of Sir Richard Mayne's officers, because the man who looks at the carriage knows the mark, and I defy you to take anything and remove it to another carriage without its being discovered; you only have to look, and you will see the mark of a screw, or a rivet, or the new paint. The best thing is to mark on the carriage, "Approved, R. Mayne," and that is enough. If what your Lordship suggests is done it does not affect the bad state of the London cabs. Perhaps it would be too much to say that it has never been done, but the cases are very isolated and far between; in my 22 years' experience I never met with one case; I have heard it hinted at, but I never could prove it. When gentlemen would sit and hear such things as this, and thought that that was the cause of the London cabs being bad, it occurred to me that the practical working of the thing was entirely concealed from them. They are doing very good things now, and I have no doubt in the world that if they go on as they are doing now it will succeed; that is, giving notices. I saw a man yesterday with a whole list of papers in his hand. Notice is given to the proprietors, and then the man goes to see that it is done. The attendant at the stand sees that a man wants a check-string, and it is procured in a moment, instead of filling so many reports. The men who are employed seem to be alarmed if they do not make reports, and to think that they will be in jeopardy, and therefore they come to us every day. In my 22 years' experience, in nearly every case, the men that we summoned came about the theatres, and the worse they got. All these summonses make men careless; but it has always occurred to me that a way could be found to prevent these summonses, if the case was taken at once against the driver, instead of against the proprietor. The driver now has a complaint against him, and if I do not produce him I am liable to a penalty of 40*s.*; unless I pay this fine, and treat him well until I get him there, he will not attend. The present system is worse for the drivers, and it is worse for us. The driver says, "Governor, I have a summons here; you must look after it." I dare not discharge him.

The Witness is directed to withdraw.

Mr. THOMAS CANE, is called in; and Examined, as follows:

Mr. *T. Cane.*

842. *Chairman.*] YOU are a Proprietor of Cabs?
I am.

843. Will you inform the Committee in what part of London your premises are situated?
Near the Victoria Station. I supply the station with cabs, both on the Brighton side, and on the London, Chatham and Dover side. I am also an Omnibus Proprietor, working in Park-lane.

844. How long have you been in the trade?
I have been a proprietor myself for the last 10 years, and my father was so before me.

845. Will you explain to the Committee in what way you think that the traffic with regard to the cabs in the metropolis could be improved?
As regards the lamp, that is one very great boon, I think, to the cab proprietors, if it is done in the way that the witness explained to your Lordships yesterday; that is to say, a red light for one side of London, and a green light for the other; it will not only satisfy the passenger better, but the men, and I think also the proprietors. As regards the shilling for the first hiring, of course you are well aware that that is no great boon to the trade; we have it already, scarcely one sixpence is given to a cabman in a week. As far as the inspection goes, I think that we ought to have a notice previous to a summons, which Sir Richard Mayne did not press until lately; he is summoning a great proportion of the proprietors now under a very old Act of Parliament as regards inspection, before

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a notice. Previously he served us with a notice to get our carriages repaired before a summons.

846. Earl *Stanhope.*] Why would that notice be of service to you?

For instance, I am the proprietor of 24 cabs working in the Victoria Station, I cannot see every one of those cabs; there may be a pannel broken to-day; it starts this morning, and I do not know that the pannel is broken, but if one of the attendants says that it is broken, and I am served with a notice, of course I will have it repaired immediately. Very frequently a cab is broken after it has left the yard in the morning, and a summons is issued before that cab comes home. As for improving the general traffic of London, I think that we could do away with about 1,500 or 2,000 of the worthless carriages which we have now got by altering the practice as to the license; if you make the license payable at once, you will do away with the bad carriages which you have.

847, *Chairman.*] Would not that reduce the number of cabs?

Yes, a very great deal. I will explain it to you. When the London season commences a very great number of cab drivers with no capital, but with merely, perhaps, four sovereigns in their pocket, start as cab proprietors; they come to a large contract proprietor like myself, and say, "Have you an old horse for sale?" We are always too glad to dispose of old horses, they are nearly worn out, and are of no utility to us at all, although they may be useful for agricultural purposes. The driver says, "How much will you take for this horse?" and the proprietor says, "I will take 3 *l.* for it;" he pays the large amount of 3 *l.* for this old horse, and he then turns round and hires a rickety old cab of one of these coach-makers at 10 *s.* per week, and by the same rule he can hire a set of harness for 1 *s.* 6 *d.* a-week, so that in reality he starts as a cab proprietor with three sovereigns; he pays one sovereign for a license about May, and he drives this poor jaded old brute through the London season, May, June, and July, at the expiration of which time the horse is sent to the knacker's yard, and the cab is sent back to the man of whom the driver hired it, and that driver slumbers on till the next spring. That is the cause of having such bad cabs in the London streets; the men have no capital, and a man of capital has no chance by the side of those men; but if you make that driver pay his 9 *l.* for the year for duty and license when he starts, it will stop all these little men, and you will have good carriages.

848. Earl of *Airlie.*] Could not that be met by having a proper inspection of the cabs?

The cabs are inspected daily, but I am sorry to say that there is so much under current working with the man who drives this jaded old horse, that if he can slip a sixpence or a shilling into the inspector's hands, he will not see; but if there is a horse of mine which does not suit that man, he will go directly to the inspector and show him the horse, and I immediately have a summons to discontinue it; whereas this small man never gets before the inspector so as to be served with a summons; it is the large proprietor, and the man who is really doing the business well, who gets into trouble.

849. *Chairman.*] Do you mean to say, that a license for which only 1 *l.* is paid would enable a man to drive a cab for three months in the summer?

Yes, and 1 *s.* a-day duty. We want to make the duty and license one, and then you will do away with all these bad cabs which you have in the streets. The duty is paid in 12 equal instalments. If you followed out that suggestion, you would have good carriages in the public streets, and you would have men of capital; those are the men whom you want as cab proprietors. There is one other point which, perhaps, your Lordships will allow me to mention, respecting lost luggage. If you could put a clause into your Act, so as to place us under the Common Carrier's Act, it would be a great boon to the trade. The class of men of whom I have been speaking, with no capital, start as cab proprietors, and the practice is known to be carried on to a great extent with these men, that they have a box or valuable parcel outside the cab, and that it is lost. It is of no use to sue them, for they have nothing; but, if the party sues me, who have 20 cabs, he, perhaps, gets 150 *l.* or 200 *l.* damages for this lost luggage, and I know nothing of it; it has been lost by one of my men, licensed of course by the authorities in Scotland Yard.

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850. Do you propose that your liability should be limited?
To 10*l.*, as is the case in the Common Carriers Act.

851. The common carriers, I think, are not limited to 10*l.*, except in the case of certain valuable articles, such as plate and watches and time-pieces?
That is the description of articles supposed to have been stolen off cabs when we have a claim sent in.

852. Earl *Stanhope.*] Have you ever had to pay any large sum in damages?
Yes; 50*l.*, 60*l.*, or 70*l.*

853. Was that in consequence of an action?
It was in consequence of proceedings by private people, who said that they had lost luggage off a cab. For instance, we have an action now in which, first of all, the party alleged that the damage was 12*l.*, but afterwards increased the amount.

854. Lord *Stanley of Alderley.*] Is not the law with respect to lost goods the same with you as it is with railway companies?
Unfortunately it is not.

855. In what respect?
They are limited under the Common Carriers Act.

856. They are not limited. You may recover a larger sum from a railway company than 10*l.*?
If there is any neglect on the part of the servants.

857. Earl *Stanhope.*] If a claim is made, I suppose that proof is required as to the property said to be lost?
Unfortunately there are so many persons devoid of any feeling for their fellowmen that they have no conscience as to that, and that they get all that they can. We want to be put under the same Act as hotel keepers.

858. Lord *Stanley of Alderley.*] What Act do you wish to be put under; do you wish a new law to be made for you, enacting that you shall never be liable for more than 10*l.*?
We want to be put under the same law as hotel keepers and railway companies. I think that if you inserted such a clause in the Act it would be a very great boon to the trade.

859. You wish to be relieved from the obligation of making good the value of things lost in your cabs?
We do not wish to be exempt *in toto*, but we want to be put under a certain restriction how much it is to be for.

860. Earl *Stanhope.*] How is it with carriers?
They, I believe, are liable for 10*l.*, and not more.

861. Are they not liable for more in any case?
I cannot say exactly; at all events, the Bill has been perused by our solicitor, and he has recommended us to make this suggestion.

862. Lord *Stanley of Alderley.*] I do not think that you are correct in your law as to a railway company?
It is so with regard to common carriers.

863. A common carrier is liable to the amount of any goods entrusted to him?
To the amount of 10*l.*

864. Earl of *Lucan.*] What is the largest amount which you have ever paid upon any one loss?
Sixty pounds; I have known as much paid as 300*l.* for lost luggage outside a cab.

865. Earl *Stanhope.*] Did it come to an action before a jury?
Yes.

866. And the jury assessed that sum?
Yes.

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867. What is the law in the trade now with respect to any driver with a broken pane in his carriage?

The carriage is unfit for public use if it is in that state; we are liable, I believe, to a penalty of 40 *s.*

868. Is it not the fact that drivers, not unfrequently drive with a broken window on the plea that they are going homewards, and that this lies in their way?

I have known such a case to occur.

869. *Chairman.*] Would they be liable to a penalty if they were summoned in that case?

There is a question with regard to that; the glass might have been broken by the last fare.

870. Lord *Stanley of Alderley.*] Why could not a man be prevented from plying if his window was in a bad condition?

The carriage certainly would be unfit for public use.

871. Earl *De Grey.*] You say that the driver is now liable to a penalty?

Yes; he ought to go straight home, and to have the window repaired immediately.

872. Lord *Stanley of Alderley.*] It is open to any person who gets into a cab and finds a window broken, to enforce the penalty against the owner for having a cab unfit for public use?

Certainly.

873. Earl *Stanhope.*] In that case the plea would not be admitted of the window having been broken by the last fare?

I have known the magistrate to look over the case, when it has been properly explained by the man. With regard to traffic regulation, if we could only get the duty and the licence paid at one time it would be a great advantage.

874. Lord *Stanley of Alderley.*] It might be a great advantage to the rich man, but it would prevent the poor man from carrying on his business, and would not it to that extent diminish the amount of accommodation which the public now receive?

You would have better cabs.

875. It might operate so as to secure a better description of cabs, but would it not take a great number off the town?

It would take off a great number of the present ones, but it would encourage other larger proprietors to have better ones.

876. It would be one advantage to the rich cab proprietor, but it would be very prejudicial to the poor man who might take a cab for a limited period?

Yes, but those are the descriptions of vehicles of which we have so much complaint. If you examined Sir Richard Mayne upon that point he would inform you that there are more complaints upon that very point than upon any other.

877. *Chairman.*] Did you hear me read the 5th paragraph of the 17th clause, as it is proposed to be amended?

Yes.

878. What is your opinion upon that enactment?

The Commissioner now stamps the cab as being in a fit and proper state for public use; but by having another plate on the cab it would look unsightly; we have two plates now on the cab, namely, the table of fares outside and the Stamp-office plate.

879. In point of fact, at present, the mark which shows that the cab is fit for public use is not visible to any person using the cab: he does not know where to look for it, does he?

It is not visible, certainly; but there is very little difference as regards that; large proprietors generally have their cabs in a good state of repair.

880. But with regard to small proprietors who have not their cabs in a good state of repair, if there was a plate of this description as visible as the Stamp-office

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office plate, would it not tend to prevent those cabs which were unfit for public use, from plying in the streets?

Unfortunately there are certain parties in office who are not paid sufficiently remuneratively to look after these things and who cannot be made to see these complaints, or a bad carriage. The law is just as effective now; it is merely for the waterman to see whether the proper stamp is in the cab.

881. Lord *Methuen.*] You mean to say that the fees which the parties in office get from the small cab proprietors prevent them from doing their duty?

I am sure of it.

882. Lord *Stanley of Alderley.*] Your complaint is not as to the present state of the law, but of the way in which the law is carried into execution?

It is very much of the present state of the law.

883. As far as the inspection goes, you attribute its not being sufficient to the officers not doing their duty?

In a very great many ways I do.

884. I think you have stated that you provided cabs for the Victoria Railway Station?

I do.

885. What are the regulations under which you supply those cabs; what conditions are imposed upon them by the railway company?

I pay 5 *l.* 4 *s.* per year for each cab as a rental.

886. And is no cab allowed to ply at the railway station except such cabs as have paid that licence to the company?

Those are the only cabs which are allowed to go into the station to ply for hire.

887. Does that rule apply to all the railway stations?

Yes, with the exception of the Waterloo Station; that is the only exception.

888. Is it a consequence of that, that the cabs furnished at that station are worse than the others?

They are allowed to go into the Waterloo Station upon payment of a penny.

889. Do you think that there is any advantage in that regulation by which no cabs are allowed to go into the station except those which pay a licence to the railway company?

It is an advantage to the railway company, as they have the pick of the trade, and they have the best cabs.

890. Would the cab proprietors wish that regulation to remain in force, or to have it relaxed, so that all should be upon the same footing as in the case at the South Western Railway Station?

Speaking upon the broad principle, they would like it to be upon the same footing as at the South Western Station. A cab coming with a passenger from the London and North Western Railway to London Bridge, is not allowed to take up a passenger at London Bridge, but must go back empty, and it is the same the other way; and that is a cause of the great blockage of the City of London.

891. You think that there should be no limitation upon a cab taking away a fare from a railway station, as well as taking a fare to it?

That is my opinion.

892. Is any inconvenience occasioned at the South Western Railway Station by all cabs having a right to go there, and take away passengers?

No; when the yard is full, the gate is closed, and no more cabs are required.

893. Is there always a sufficient supply of cabs at those railway stations which enforce the rule which you have mentioned?

Yes; there are always plenty of cabs; there is an over-abundance of cabs at the Waterloo Station.

894. Is there a sufficient number at the other stations; do you think that, is far as the public are concerned, there is more security for getting a good supply of cabs at the South Western Station than at the other stations?

I do.

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895. And do you say that frequently there is not a sufficient supply of cabs at those stations which prevent their coming without a licence?

I do not say that there is not a sufficient supply, because directly the railway officials find that there are only one or two vehicles, they apply to the street rank and have some of the street cabs in; there are always plenty of cabs.

896. Lord *Methuen.*] You think that they have better facilities at the South Western Station for working that system than anywhere else; they have larger space?

Yes, they have larger space.

897. Earl of *Kimberley.*] Would you be satisfied if you were put under a similar regulation to that which exists in the Common Carriers Act?

Yes, it would be a great boon to us.

898. Earl *De Grey.*] Practically, however, the public would have no opportunity of making any communication to you (the cab proprietors) as to the value of the articles which they wished the cab to carry; there would be no means of securing themselves against loss, such as that which is afforded to the public in the case of common carriers, by making a declaration of value, because a declaration of value made to a cab-driver would be worth nothing at all; you would not like, probably, to accept that declaration, on your part, and the public would not think much of their chance of getting the cabman to admit it afterwards.

No; but one would think that if a passenger had a portmanteau with valuable contents he would put it inside, or the gentleman or lady would say, "It is very valuable," and the cabman would say, "Allow me to put it at my feet," whereas it is now put behind him.

899. Would you be content with such a declaration made to your cab-driver?

Yes; I would much rather have that than have it without any declaration or caution to the driver at all. A driver should have some chance; but now not a word is said upon the subject; the portmanteau is put upon the roof, and very often the owner of it is in league with some person outside; there is, perhaps, no value in that portmanteau, to the extent of 5 *l.*, and we are sued to the amount of 50 *l.* or 60 *l.*, and it becomes a complete trade.

The Witness is directed to withdraw.

Ordered, that this Committee be adjourned to Thursday next,
One o'clock.

Die Jovis, 28° *Februarii*, 1867.

LORDS PRESENT:

Lord Steward.
Earl of Airlie.
Earl of Lucan.
Earl of Belmore.
Earl De Grey.
Earl of Kimberley.
Lord Stanley of Alderley.
Lord Houghton.

The EARL of BELMORE in the Chair.

Mr. HENRY DE JERSEY, is called in; and Examined, as follows:

Mr. *H. De Jers*

28th February 1867.

900. *Chairman.*] I believe you are Chairman of the Commissioners of Sewers, and Under Sheriff of London and Middlesex?

I am.

901. How is the City Commission of Sewers constituted, and what are the duties which it performs?

The Commission of Sewers of the City of London is a body constituted under an Act of Parliament, a certain number being nominated by the Corporation of the City of London. It consists of about 100 members. Our powers are very extensive, under the City Sewers Act of 1848, and various other Acts of Parliament especially applying to ourselves, and other Acts imposing duties which have been placed in our hands by the Legislature, so far as the City is concerned, such, for instance, as the Bakehouses Act, the Sanitary Acts, and other Acts of that description. Our principal Act of Parliament, under which we were constituted, is the Act of 1848.

902. *Lord Steward.*] To what part of the Bill do you wish to call the attention of the Committee?

To the part which relates to the scavengering, and the removal of snow, more particularly: Clause 5 is the clause relating to scavengering. The duty of removing dust, ashes, and refuse in the City of London is reposed in us, and we are authorised by the Act to which I have referred to appoint scavengers. By the 82nd clause of the Sewers Act of 1848 it is provided that, "It shall be lawful for the Commissioners to appoint and employ a sufficient number of persons, or to contract with any company or other person for the sweeping, cleansing, and watering of the several streets within the City, and for collecting and removing all dirt, ashes, rubbish, and filth, and for the cleaning out and emptying of privies and cesspools, privies, and drains; and such persons shall be called scavengers; and such scavengers, or their servants, shall on such days, and at such hours, and in such manner as the Commissioners shall from time to time appoint, sufficiently execute all such works and duties as they shall respectively be employed or contract to perform." And in the event of the scavengers failing or neglecting to perform their duty, or disobeying the law in that respect, they are subject under that clause to a penalty. We enter into contracts with persons for the removal of dust and ashes, and for the scavengering of the streets and watering; and our contract this last year amounted to 26,000 *l.* for the City of London, which was very largely in excess of the contract in previous years. That was principally because the Commission imposed more severe

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duties upon the scavengers with regard to a second cleansing, in the event of the streets not being properly cleaned the first time.

903. *Chairman.*] Are there any hours now in which you oblige the scavengers to remove the mud?
The hours in the principal streets are between four and nine in the morning, and they must be cleansed daily. Other streets are cleansed at other times according to the nature and the class of street. We have schedules of the particular streets, which I will furnish to the Committee. Our object is to have the carts in the streets for cleansing the streets at such times as will least impede the traffic.

904. Earl *De Grey.*] You have stated that you do not allow the principal streets to be cleansed later than nine o'clock in the morning?
Except in cases of a second cleansing being required, and then, as men could not sweep with the broom at a time when the streets were full of traffic, we have carts with brushes at the end to go through the streets.

905. You find that in certain states of the weather, or on certain occasions, it is necessary to have a second cleansing at a later period of the day?
We do.

906. Lord *Stanley of Alderley.*] At what time have you that second cleansing?
At any time when it is ordered by the inspectors, or when it is necessary. They endeavour to consult as far as possible the convenience of the public. Your Lordship is aware that during some hours of the day in some streets there is more traffic than at other times, and they would select those hours when there was the least amount of traffic in those particular streets.

907. Have you no engagement with the contractors as to the particular time when their work shall be done, or is it left entirely to their discretion?
The discretion is not with them but with our officers.

908. And you give directions to the contractors from day to day as to the time at which the second cleansing is to take place if necessary?
If the inspectors in the morning find that the streets are not properly cleansed, they then order the scavengers to cleanse them at a particular time in the day, and they do it.

909. *Chairman.*] Supposing this clause affected the City, it would not enable the contractors, would it, to take a greater number of hours to perform their work than they are now bound to take in their contracts with you; it would not have the effect of annulling their contracts as against you, would it?
I think it would. The streets in which cleansing is to be allowed in the middle of the day are to be approved by the Commissioner of Police, and the Commissioner of Police might make orders in direct opposition to those orders which we make. We have the best means of knowing what is best to be done.

910. Lord *Stanley of Alderley.*] Are those contracts made annually?
Annually, and they are of a very stringent character.

911. If a discretionary power were given to establish bye-laws with the sanction of the Secretary of State, which might be some deviation from the strict letter of the Act, would not that meet your case?
Many cases would arise where it would be exceedingly prejudicial. Streets are altering in their character. A street which is now, perhaps, not of any considerable importance, may, in consequence of a railway station being built close to it, be rendered a street of very great importance: under this clause there would be the formality of going before the Secretary of State in order to make arrangements which we make almost at a moment's notice.

912. Could not those arrangements be made equally rapidly by the Commissioner of Police making such an alteration as would require the approval of the Secretary of State?
I do not know how rapidly it could be done, but it would be in direct opposition to the Act of the Legislature imposing those duties upon us, we being considered the authority best calculated to carry them out.

913. *Lord*

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913. *Lord Steward.*] Seeing that the clause gives the limit between seven in the evening and ten in the morning, and your contracts, as you state, are within those hours, viz., between four a.m. and nine a.m., how would this clause affect the contracts?

The clause says, " No person shall cleanse the streets between the hours of ten in the morning and seven in the evening, except in such streets as may be approved by the Commissioner of Police."

914. Between seven o'clock in the evening and ten in the morning they may cleanse the streets. Your contracts are between four and nine, and these hours fall between seven in the evening and ten the next morning; how would the clause affect you?

I do not think that does affect us.

915. *Chairman.*] The effect of this clause would be to prevent you from making a contract for cleansing the streets between the prohibited hours; but in the case of a contractor who had made a contract with you to cleanse the streets within a less number of hours, it would not have the effect of cancelling his contract with you, would it?

It places us who are the parties to enter into the contract in the position of having another body riding over us, and making alterations in contravention of that contract.

916. It would not affect present contracts?

No, but we must regulate future contracts by the will of the Commissioner of Police.

917. *Lord Steward.*] It would not affect the custom which you have adopted of having the streets cleared between the hours of four and nine?

It would not affect that.

918. Earl *De Grey.*] It would prevent your having a second cleansing at a later period of the day?

Yes, unless we had the consent of the Commissioner of Police. Our object is to have the traffic impeded as little as possible.

919. *Chairman.*] Is the City Commissioner of Police under the orders of the Corporation?

He is under the orders of the Court of Aldermen, and the Commissioners of Sewers are appointed by the Court of Common Council, the old Corporation. Then this clause goes on to state: " any person doing any act in contravention of this section, shall be liable for each office to a penalty not exceeding 40 *s.*" I do not know whether that would be superadded to the penalty which the contractors are liable to, if they do not perform their contract. That is rather an important thing that a man should be liable under our Act to be fined (and hardly a week elapses but we impose some fines) and that we should be still liable for the same offence to another penalty. That is rather a serious position to place an individual in. Then it occurs to us that a clause might be very fairly introduced into the Bill, to the effect that the inhabitants should, at a certain hour to be regulated by us, say 7 or 8 in the morning, bring down, as they do in some cities abroad (I believe they do it in Paris), where the inhabitants think proper to do so, barrels of dust, and place them on the footpavement, the consequence of which would be, that the dustman passing through the street, instead of knocking at every door to collect the ashes and dust, might, seeing the barrels, empty the barrel into the cart. That would facilitate matters to a very considerable degree, and lessen to a very considerable extent the time that the cart would be in that street. In some streets of the City, Bread-street, Friday-street, streets of that character, it is most important that those carts should be there as short a time as possible; because after a certain hour, a large number of waggons, such as Pickford's and Chaplin's, come in with goods, and it is not desirable to have the dust cart in the streets then.

920. Have you no power under your present Act to make a regulation of that sort?

No.

921. Are you aware that there is a regulation of that sort in Liverpool?

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We have heard that there was in some towns. If you will allow me, I will hand in a clause to provide for that (*handing in the same*).

922. Earl *De Grey.*] If I understood you rightly, you said that the inhabitants should do this, if they thought proper to do so. If it is to be voluntary on their part, where is the necessity for an Act of Parliament on the subject?

In case it should be regarded as an obstruction of the streets. The inhabitants want the dust removed, and instead of the dustman going to the top of the house for the dust, as he has now in most cases to do, the dust would be brought down into the street by the inhabitants. The fact is, that the cellars are of so much importance in the City that the dust bins are at the top of the house in a large number of warehouses in the City, and therefore it takes a good deal of time to go to the top of the house to bring it down.

923. *Chairman.*] Do you propose that the inhabitant should take his box of dust down at any hour he thinks fit during the night, so long as it is before eight in the morning, or that there should be a bellman accompanying the cart?

We should inform the inhabitants what time the dustman would go down a certain street. Say at seven or eight o'clock the dustman would go through a particular street, and wherever he found a barrel or a box he would remove it, but if he found no barrel or box before a particular door he would know that the inhabitant of that house did not require any dust to be taken away.

924. Earl *De Grey.*] If the clause which you propose enabled the inhabitants to do it, and did not compel them, it would enable them to do it any time in the night, before eight o'clock in the morning. Would it be convenient to have boxes of that description on the pavement during the night?

No. The clause is faulty in that respect; it should be as near the time of the cart coming round as possible, in order to create the least possible obstruction.

925. *Lord Steward.*] If it is the custom for the dustman to go up to the top of the house, and bring the dust down himself, would there be any inducement on the part of the inhabitant of the house to take the trouble to bring it down himself, if he were not compelled to do so?

I believe that under the clause which I propose, the inhabitants would be saved a large amount of trouble in this way. The dustman is bound by his contract to call at the houses certainly twice a week. He may demand to go to the top of the house, which is an inconvenience to the inhabitant, because he may not require the dust to be removed at that time; whereas if he brought it down himself that inconvenience would be obviated.

926. Are the inhabitants now compelled to submit to the visits of the dustman going to the top of the house?

If there is dust in the house, and the inhabitant refuses to have it removed, he is liable to a penalty. We often have the contractors saying, that they called at certain houses, and required the dust to be removed, and the inhabitants refused to have it removed; and in such cases I say, "Why do not you summon them?" In a sanitary point of view it is our duty to see that the poor are protected; and we endeavour to do everything which will prevent the accumulation of dust and refuse in houses.

927. Do you mean that, under the present law, where a contractor has agreed with you to call at different houses, for the purpose of removing dust, he has by law power to enter the houses, and to proceed to the top of them, to see if there is any dust requiring to be removed?

Yes; he would ring the bell, for instance; and if he was told that there was dust at the top of the house, and if the inhabitant said, "You shall not remove it," the inhabitant would be liable to a penalty, for refusing to allow him to do so.

928. Do you think that the inhabitants would rather have the trouble themselves of bringing dust down, and depositing it in the streets, than allow the contractor to go up when he liked to the top of the houses?

I have a warehouse in the City myself; and I should certainly give my servants

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servants directions to take the tub down rather than have the dustman walk to the top of the house.

929. Earl *De Grey.*] Does the dustman call at the same houses on the same days in the week?

That is generally the case. In Friday-street, and Bread-street, and those streets, the occupiers of the houses would say, Thursday would be a convenient day for us.

930. Lord *Stanley of Alderley.*] Do you propose that this collection of dust should be daily?

I would say that the inhabitants should bring down the dust when they thought proper; for instance, one person would bring it down every second day, and another every third day; but if they knew that there was a stated time for the dustman to go through a particular street, that would be the day to bring it down.

931. From the absence of areas in houses in the City of London, it is very difficult, is it not, to find proper dust-bins in the lower part of the houses?

Very difficult indeed; in the business parts of the City the dust-bins are at the top of the houses. I am speaking of the large warehouses.

932. *Chairman.*] Have you any observations to offer to the Committee on the 13th clause?

Under that clause the Commissioner of Police is authorised to make regulations with respect to the route of carts and carriages; I submit that there should be reserved the rights of the Commissioners of Sewers, with reference to dust carts, and with regard to their contractors carrying out their contracts, and also a reservation of the rights of the Lord Mayor of the City of London, who has an undoubted right to stop up the streets.

933. Is not the right of the Lord Mayor reserved?

No. The clause says, "The Commissioner of Police of the Metropolis, with the approval of the said Secretary of State and the Commissioner of City Police with the consent of the Court of Mayor and Aldermen, and subject to the approval of the said Secretary of State, may, from time to time, make regulations to be observed by all persons within the special limits of this Act," but at a moment's notice it may be requisite to stop up streets. In the City you sometimes see a notice board in a street with the notification that it is stopped by order of the Lord Mayor, arising from circumstances making it absolutely necessary for the public convenience that the street should be stopped. This would deprive the Lord Mayor of that power, and would also place us under the power of the Commissioner of Police, and make us subject to regulations which would be exceedingly inconvenient in carrying out those powers which the Legislature has entrusted to us. I therefore submit that the rights of the Lord Mayor and the Commissioners of Sewers to close streets should be reserved. We frequently stop up streets for the purposes of paving and repairs; it would be very questionable whether we could do so if this clause stood as it does; we ought to have that power without being required to go to the Commissioner of Police, and to the Secretary of State.

934. Is your only objection to the control of the Secretary of State the delay that would be caused?

Yes, the necessity for closing the street may be urgent; the rules made by the Secretary of State would be for all time; but these things arise at a moment.

935. The rules are made from time to time by this clause?

Yes; but many circumstances occur rendering it necessary at a moment to do certain things.

936. Lord *Stanley of Alderley.*] Would not the Commissioner of Police be competent to give those orders as expeditiously as the Commissioners of Sewers, or the Lord Mayor?

It is placing the Commissioner of Police over a body which is constituted by Act of Parliament to do certain things.

937. It is not proposed to give any authority the power of intervening in the

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rest of London; why should what is proposed be more inconvenient in the City than in the rest of the metropolis?

If it had been shown that the body over whom I have the honour to preside neglected their duties, perhaps it might be necessary to put some person over our heads to see that we did our duty; but that never has been shown yet, and I submit that it would be very unjust to put us under the power of the Commissioner of Police.

938. *Lord Steward.*] What are the powers which the Lord Mayor now exercises over the streets in the City?

By his authority the streets can be closed; for instance, in the case of a great procession.

939. Does he exercise that power under any authority given by any Act of Parliament?

I cannot answer that question. I think it is a right which we consider to be almost prescriptive. I think it is not under Act of Parliament.

940. This clause you conceive would override that, and make the Lord Mayor subject to the Secretary of State?

It entirely deprives him of his power.

941. Did I rightly understand you to say that the Commissioners of Sewers have a right to stop up the streets now?

They invariably do it for the purposes of paving. Supposing a house fell down, we should immediately place ourselves in communication with the Commissioner of Police, with the view to shutting up the street, and he would take care, by placing men there, that no person passed through the street; therefore, to that extent we have that power.

942. Do you mean to convey to the Committee that the Commissioners of Sewers have this power of shutting up streets as well as the Lord Mayor?

Yes; some streets we could not pave without such power.

943. The Lord Mayor possesses that power as well as the Commissioners of Sewers?

Yes, but for other purposes.

944. Lord *Stanley of Alderley.*] Do the Commissioners of Sewers exercise that power independently of the Lord Mayor?

Quite so.

945. And the Lord Mayor can exercise the power independently of the Commissioners?

Yes.

946. Do I rightly understand you to say, that the Lord Mayor and the Commissioners of Sewers exercise the power through the intervention of the Commissioner of Police?

No; the only function which the police exercise in the matter is placing men to see that the street is properly stopped, merely as a police regulation; we take power to stop up streets in certain cases; when the Lord Mayor does it it is on occasions when we could not stop the streets; something quite *de hors* our powers.

947. Earl *de Grey.*] You observe that the regulations which are to be made under clause 13 refer only to three points; to which of those three points do you object on behalf of the Commissioners of Sewers as interfering with your powers?

"First, with respect to the route to be taken by all carts, carriages, or other vehicles passing along the streets, with power to prohibit any cart, carriage, or other vehicle from coming into any street or part of a street for the purpose only of passing to its destination in some other street or part of a street." That might interfere very greatly with our contracts for the removal of dust, and for scavenging streets.

948. Do you hold that that would prevent you closing the streets for other purposes?

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On reading it again it does not appear to me that it would. I beg to hand in the proviso which we suggest should be added to that clause. [*The same is handed in.*]

949. *Chairman.*] Have you any objections to make to clause 18?

My objections to that clause are very great. We are the street authority in the City of London: and, as I have already said, we have power to enter into contracts with scavengers for the removal of everything necessary to be removed from the City of London, including snow. In consequence of those contracts being more stringent this year, as I stated before, the amount paid to the contractors has very much increased, and we are paying them 26,000*l.* this year. We impose penalties upon the contractors if they do not perform their work, not cleansing the streets, cleansing them inefficiently, and allowing mud to remain in the streets instead of sweeping it up and removing it immediately, and many things of that kind. I will draw your Lordships' attention to the snow which fell in January last. In the report of our engineer upon it, he says, "The snow storm occurred on the night of Tuesday the 1st inst., and on Wednesday morning the quantity of snow lying upon the public ways of the City was about 116,546 cart loads. Of the 116,546 loads, 54,548 were upon the main lines of City thoroughfare;" and I should tell your Lordships that we have in the City alone some seven or eight miles of main street, and throughout the length and breadth of the City, taking alleys and courts and everything else which may be considered as a street for the purpose, we have something like 50 miles. He goes on: "Snow readily compresses, and I consider three loads of snow measured, as it laid on that morning, could be carted away as one load; on this assumption there required to be carted away from the main lines of thoroughfare, on the Wednesday morning, 18,182 loads, and in the whole City, 38,848 loads." Now, the snow remained some days in the City; a great deal was done, but it was practically impossible for the contractors to move away all that number of cart-loads of snow in one day, and therefore a great portion of it lay a considerable time.

950. Lord *Stanley of Alderley.*] Where did the contractors deposit the snow which they took away?

They would get rid of it in the best way they could. There are lay stalls around the City, and I dare say a great quantity of it was thrown over London Bridge into the river.

951. Do you consider that they have the right to deposit snow in the river?

I think not.

952. What law prevents their doing it?

I should think the Conservators of the Thames would not allow it. It would be very difficult to remove snow without removing dirt with it.

953. Are you aware of any positive enactment enabling the Conservators to prevent snow being put into the river?

I cannot point your Lordships to any clause.

954. Earl *De Grey.*] Have not the Conservators the power to object to anything being thrown into the river?

I believe they have, though I cannot point your Lordships to the Act.

955. *Chairman.*] Will you explain in what manner clause 18 would have interfered with you on the occasion of the fall of snow in January?

The state of things which the clause would create, would, as it seems to me, be a perfect anomaly. The contractors were summoned by us for neglect of duty for not having removed the snow. They put on an extra strength, they had more than double the number of carts and men, and they were very energetic and did the best they could; but inasmuch as they had been paid by their contract price a large sum in addition for emergencies of this kind, and they had not performed the duty for which they were paid, we fined them a considerable amount, something under 1,000*l.* for neglect of duty in respect of non-removal of snow for three or four days. Now, the operation of this clause would be extraordinary. Under our Act of Parliament we sit as a Board, exercising the power of fining individuals for not carrying out contracts, for non-removal of snow and other things, and at the same time, we, the street authority, would be liable under this clause, perhaps the next day, to be dragged before a magistrate and fined, because we had not done our duty.

956. Would not the words "with all practicable speed" prevent your being fined if you could show that all practicable means were used?

My objection goes to the very root of it; I believe it to be a very unjust thing to place the street authority in the power of the magistracy, and to say that we should be summoned and fined, because we do not do our duty. We, the street authority, have no power to do it; we cannot go into the streets and clean the streets, we have the power to contract with individuals, and the Legislature has given us the power to fine those men, and to see that they do their duty, but it would be a novelty to me that we who have that power given us to enter into contracts and to compel others to do the work, should be fined for the non-performance of that work. There would be this extraordinary anomaly; we fine those men, say 1,000 *l.*, and that comes back into our rates, or rather we pay them 1,000 *l.* less, and therefore the rates are benefited to that extent. Then, under this clause, we should have to pay the penalty which would come out of the rates, because the work was not done, not by us, but by the contractor.

957. The contractor is acting as your agent?

Yes.

958. *Lord Steward.*] Supposing the street authority to neglect its duty, do you consider that there ought to be no power by Act of Parliament to enforce the performance of that duty?

It is hardly competent for me to lay down any rule of that kind; but I go upon the principle of the thing. When the Legislature says certain duties shall be imposed upon a certain body, as the street authority, and when the Legislature has given them certain powers, and that street authority exercises those powers to the best of their ability (and it is their interest, and the interest of the rate-payers, of whom they are the protectors, to get this work done), it is hardly just, as it seems to me; because, in the opinion of the magistrate, the work has not been done by the street authority, that the street authority should be dealt with in the manner proposed by the Bill. I should be sorry myself to emain the street authority if that clause were passed.

959. *Chairman.*] Does not your argument go to this extent, that if Parliament entrusts a certain body with the duty of removing snow, and that body deputes that duty to their agents, they are to be relieved from all responsibility to Parliament themselves?

I could not object to our being responsible to Parliament in a proper way, but I object to our responsibility being such that we can, at the instance of any inhabitant, be summoned before a magistrate and fined.

960. The magistrates in the City are the Lord Mayor and the Court of Aldermen, are they not?

Yes.

961. Earl of *Airlie.*] Is not it your duty to fine contractors if they have not performed the service efficiently?

Quite so; we do so repeatedly, weekly. It would be rather a novel thing that magistrates (because, as Commissioners, we stand in that character), should be inflicting penalties upon individuals, and that then we, the parties sitting in authority and deciding, should be ourselves liable to a penalty for the same act.

962. If you failed to find contractors to peform the duty efficiently, is not it reasonable that you should be liable to a penalty?

I do not think it at all reasonable that a body having this authority, placed in their hands, should be liable to be taken before a magistrate and fined.

963. Earl of *Lucan.*] It has been proposed to this Committee that instead of its being open to any inhabitant to take proceedings they should be taken only at the instance of the police authority; would you object to that?

It is a very objectionable thing to place the street authority in that position;

our work is perfectly voluntary, and we receive no payment, and it is not right that we should be liable to be taken before a police authority and fined.

964. So that you claim immunity for neglect of your duty?
If I do so it is because the Act of Parliament has given us the power; Parliament has given us certain powers.

965. But, as we understand, the public are dissatisfied with the way in which you have exercised those powers?
I do not think that that has been shown.

966. We are legislating on behalf of the public, who, we understand, are dissatisfied with the way in which you have exercised those powers, and we want to throw the responsibility upon you; you, on the other hand, claim entire immunity for the discharge of your authority?
If the Legislature think that the body over whom I have the honour to preside have neglected their duty in the City of London, which I utterly deny, it is quite time that there should be a new authority and new legislation.

967. Lord *Stanley of Alderley.*] Do you think it at all unreasonable, when Parliament has imposed certain duties upon any authority, that that authority should be liable to be called in question, if it should be found that it has not performed its duties properly?
I think it would be unreasonable; I think if the Legislature intended that we should be subject to any higher power, it ought to have been included in our Act of Parliament of 1848.

968. *Lord Steward.*] A subsequent Act may amend a previous one?
Yes, or may make it worse. This Act of 1848 is not the only Act we are under, but we have duties imposed upon us under the Sanitary Acts and the Bakehouse Act; if it is necessary that we should be exposed to that liability in one case, it is necessary in all.

969. Earl of *Lucan.*] You do not, as I understand you, propose any modification of this clause?
I object to it entirely.

970. Lord *Stanley of Alderley.*] You claim the right to exercise your authority without liability to censure in the case of neglect of duty?
No, I do not put it that way; the public may censure if they think proper; I say, with regard to us they have nothing to censure.

971. That would be for the magistrate before whom the case of alleged neglect of duty was brought. It would be for you to show that you had done your duty, and if in his opinion you had done all that you ought to have done you would not, of course, be liable to censure, but if you had not done what you ought to have done, is not it reasonable that you should be liable to censure, and even to a penalty?
I think it a new principle of legislation.

972. *Lord Steward.*] Do you conceive that any fine imposed under this clause upon a street authority would be paid out of the rates?
I apprehend so, because I find this at the bottom of page 9, "A pay-order made by a magistrate under this section in favour of any person, shall be conclusive evidence of a debt to the amount therein specified being due and payable from that authority to such person, and shall be a first charge on all property and funds belonging to such street authority, and on the proceeds of any rate thereafter levied by that authority, so, nevertheless, that in case where such sum is paid out of other funds than the proceeds of the street rate such last-mentioned funds shall be reimbursed out of the street rate."

973. The objection you entertain to the street authority being summoned and being liable to a fine is the wounding of the personal pride of the street authority, and not a matter affecting the pocket in any way?
It is not a matter of pride, it is a matter of principle.

974. Earl of *Kimberley.*] Would not you be liable under the present state of the law to be indicted for a neglect of your duties?
Perhaps at common law we should. If the Legislature thought that we did not sufficiently fine our contractor, and chose to impose additional penalties upon the contractor, they might do so, though I should think that would be unjust,

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unjust, because it would be rendering the man liable to two penalties for one offence.

975. Do the Commissioners hold their office for life, or are they appointed annually?

They are appointed under the Common Seal of the Corporation every year, the Commission varies to a certain extent every year. I have been a member of the Commission for 13 or 14 years.

976. If the Corporation were dissatisfied with the performance of the duties by the Commissioners, they could appoint others?

Yes; the Commissioners used to be a body of something like 60, now they are 100. It was the will of the majority of the Corporation that the number of members should be increased, and it was largely increased. I wish to draw attention to the fact that the Lord Mayor, who is a magistrate, a certain number of Aldermen, who are magistrates, the Recorder, who is a judge, and the Common Serjeant, who is a judge, are all members of the Commission under the Act of Parliament, and they are part of the street authority; you cannot disentangle one member of the Commission from the others, so that this clause would create rather a novel state of things, for it might fall to the lot of the Recorder to have the street authority brought before him, he himself being a member of that body.

977. Earl of *Airlie.*] With regard to the removal of snow, did not the Conservators of the Thames give you leave ultimately to throw the snow into the river?

We never asked them, but it was done; it was done by the contractors at night.

The Witness is directed to withdraw.

Mr. BENJAMIN FIELD, is called in; and Examined, as follows:

Mr. *B. Field.*

978. *Chairman.*] I BELIEVE you appear here on behalf of the wine and spirit merchants in the City?

Yes.

979. Which clause do you object to?

The 6th clause.

980. Will you state to the Committee, shortly, your objections to that clause?

I have been requested by the wine and spirit merchants of the City to state to your Lordships that if clause 6 were to be carried into effect it would be perfectly impossible for them to carry on their trade at all. Even supposing that the whole of their trade consisted in delivering from their own stocks it would be impossible, but it is rendered additionally so by the fact that a very large proportion of their trade consists in delivering from bond, and that the docks are not opened in winter till nine in the morning, and therefore I need not tell the Committee that it would be perfectly impossible for carts to be at the docks at nine o'clock, and for all those carts (or even one cart), to be loaded in sufficient time to deliver their load within the limits mentioned in this clause before 10 or even before 12 in the day. And therefore, if this clause were to be acted upon, it would be virtually impossible for the trade to be carried on. The suggestion that we have to make is this: that in the Poultry, in Cheapside, in Ludgate Hill, in Newgate-street, and in Fleet-street, there should be a restriction with respect to the time for delivering any goods, that restriction to be that between the hours of 10 and four no goods should be delivered, but that in all the other parts of the City there should be no restriction of time, because if there were any such restriction it would be simply impossible for us to carry on our business. That is the proposition which I have been asked to lay before the Committee, and we should be glad if they would take it into their consideration when they are deliberating upon this Bill.

981. Lord *Stanley of Alderley.*] You do not think that it would injuriously interfere

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interfere with your trade if the prohibition with regard to the delivery of those goods were limited to certain hours of the day in certain streets, leaving the rest of the town to be served as at present?

No; that is to say, if the prohibition had reference to the Poultry, Cheapside, Ludgate Hill, Fleet-street, and Newgate-street, leaving us the power, with regard to all the other parts of the town which are comprised in the clause, the power to deliver goods as at present.

982. You mean that the restriction should be confined to those streets?

Yes.

983. You think that it should not apply to other streets in the City and outside the City where the traffic is very great, though it may not be so great as in those streets you have named?

We think not; we think that it would not be found that there would be any practical inconvenience from delivering in such streets. We are practically restricted in our deliveries in those streets which I have mentioned under police regulations. In Cheapside, for instance, we do not deliver now between the times which I suggest should be the restricted limits.

984. Then the existence of those regulations has not interfered with your business within the limits of the City?

No; because the deliveries in that district are very limited indeed, and therefore there is no difficulty in arranging the business; but if it were a general principle applying to the delivery throughout the whole of the metropolis, it would be simply impossible to carry on the trade.

985. Do not you think that there ought to be an extension of the prohibition that exists in those streets you have mentioned?

I think not.

986. *Chairman.*] Could you give the Committee any idea of the amount of business done by the wine trade as compared with the beer trade?

I cannot give the Committee any comparison, but I can give them this information, which may enable them to arrive at some notion of the figures, namely, the amount of goods cleared from bond in the City of London in 1866. Of spirits there were 30,000 puncheons, and of wine 75,000 pipes and butts. In the year there were 125,000 puncheons, pipes, and butts carried altogether from bond, of spirits and wine; and, therefore, if you divide that by 300 you get the quantity which would be delivered per day, and of course there is a large proportion of that which would have to be delivered in London in some shape or other.

987. Lord *Stanley of Alderley.*] Can you give the Committee any idea as to what districts take the greatest proportion of those spirits and wines?

I should think there is no doubt that the largest proportion of them would be delivered within the district which under the Bill is subject to the prohibition.

988. That is to say, the district where there is the most traffic?

Yes, if you take a radius of four miles from Charing Cross.

989. Do you deliver a greater quantity of those wines and spirits in certain districts within that area than in others?

I should think that the largest proportion of the wines and spirits would be consumed in the City.

990. And from that you are already excluded, are you not?

No, we are only excluded from the great thoroughfares of the City. There is no difficulty in our delivering in all the side streets of the City; but from delivering in the Poultry, Cheapside, Ludgate-hill, Newgate-street, and Fleet-street we are practically excluded now.

991. Earl of *Lucan.*] Over what hours does the prohibition extend?

Between the hours of 10 in the morning and four in the afternoon.

992. Lord *Stanley of Alderley.*] Would you make any distinction in the difficulty which you would experience if the prohibition only applied to the delivery of large butts and pipes, and did not apply to smaller casks.

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No, I could make no distinction, because it very generally happens that when a man has given an order for large goods to be delivered from bond, he gives an order at the same time for small goods to be delivered from stock, and the two would go together, and we should of course be put to great inconvenience if we were obliged to have two deliveries.

993. Would not it do if there were separate deliveries for the two descriptions of goods, the heavier goods going earlier in the day, and the other goods in the middle of the day?

No, it would be a great inconvenience to the traffic that had to be done; the delivering of small goods takes so short a time that it would not be worth while to have them delivered separately, inasmuch as the man's cellar would have to be opened a second time, whereas one opening would otherwise do. It has been suggested by one of the gentlemen here, who is a member of one of the leading houses in the wholesale trade, that if it were insisted that the goods from bond should be delivered before 10 o'clock, the Custom House officials would have to be there at something like two in the morning to enable the goods to be delivered in this district before 10.

994. That is, on the supposition, that the whole of the metropolis was to be placed under the prohibition?

Yes, but even supposing it to apply within the City, they would have to be there at four o'clock certainly, because there are an enormous number of carts that have to take their turn, some 20 or 30 in the morning. If you take the West India Docks they are three or four miles from the heart of the City.

The Witness is directed to withdraw.

Mr. J. RENAT SCOTT, is called in; and Examined, as follows:

Mr. *J. R. Scott.*

995. *Chairman.*] I BELIEVE you are Registrar of the London Coal Market?

I am.

996. Are you charged with the control of the collection of the coal duties within the area of the Metropolitan Police District?

I am.

997. Will you inform the Committee what was the total importation of coal in London within the limits of that district in 1866?

The total importation within the limits of the Metropolitan Police area, which is also the limits of the coal duty collection, was 2,986,989 tons brought by railway, and 3,033,793 tons brought by sea, making a total of upwards of 6,000,000 tons in the year. The population at the last census within that district was 3,222,717; that is to say, the Metropolitan Police District; and the consumption of coal was equal to nearly two tons per head of the population within those limits. The population within the Metropolitan Police District may be estimated at the present time at 3,470,000 souls. I estimate the population within the radius in the proposed Traffic Regulation Bill, namely, four miles from Charing Cross, at the present time at 2,800,000. I estimate that the amount of coal consumed per head of the population would represent 1 ½ tons per head; inasmuch as a great portion of the manufacturing districts of the east end of London is beyond the radius of four miles from Charing Cross, where the consumption per head is greater. Taking the population at 2,800,000 souls, the consumption of coal within the radius would represent a quantity equal to 4,200,000 out of 6,020,186 tons imported. The trade in coal to London is so vast in character that it is estimated as representing one-fifth of the whole of the tonnage arriving in the Thames by water, and nearly two-thirds of the whole tonnage brought to London by railway. That is from the best information I have been able to obtain from railway companies; in the case of the Great Northern and the London and North Western it is absolutely so. The 6,000,000 tons of coal is the total quantity coming into London, a certain proportion of that being exported from thence, or passing *in transitu* through London under the supervision of my office to places beyond, say to Exeter or Winchester, or wherever it may be, London being the largest market for coal, next to Newcastle, or Swansea, or Cardiff, in this country.

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998. Lord *Stanley of Alderley.*] Could you state what proportion of that coal is transmitted through London by the streets, and what proportion goes along by the river to the upper parts of the Thames?

Out of the 6,000,000 tons, speaking in round numbers, 700,000 tons go beyond the limits in ships, or is conveyed beyond the limits by railway and canal; it is only 700,000 which is exported out of the 6,000,000, so that 5,300,000 tons are absolutely consumed in London in private houses, and amongst manufacturers, and in making gas.

999. What proportion of that 5,300,000 is forwarded by lighters to manufacturers on the banks of the Thames, not going through the streets?

I have assumed that a quantity amounting to 1,820,000 tons goes in that way; 4,200,000 go through the streets, within the radius of four miles from Charing Cross, out of the importation of 6,000,000.

1000. Out of that 6,000,000 tons, 1,800,000 tons do not go through the streets, but are forwarded by canals or railways, or by the Thames?

Nothing goes by canal; scarcely 15,000 or 20,000 tons now go up the Thames or the Lea. Coal is brought by the Grand Junction Canal, but very little goes beyond out of the port of London, except to foreign ports and to British possessions and to the coast. 700,000 tons is the total of all going beyond the limits by every means of conveyance.

1001. There still remains 1,000,000 tons consumed within the limits, but forwarded by the river and not through the streets?

It is forwarded by the river and then conveyed and distributed by carts.

1002. Is not there a considerable quantity consumed by works on the banks of the Thames?

Yes; possibly 1,000,000 tons.* The average price per ton of the best coals was, in 1808, 42*s.* a ton; in 1818, 34*s.* a ton; in 1828, 29*s.* a ton; in 1838, 24*s.* 2*d.* a ton; in 1848, 18*s.* 6*d.* a ton; in 1856, 18*s.* 1*d.* a ton.

1003. Do you mean by that the price to the consumer?

The price at the market before it is delivered to the consumer.

1004. What additional cost would you put upon it to pay for the expense of its conveyance to the consumer?

From 6*s.* to 7*s.* In the year 1858 the price increased to 18*s.* 7*d.* a ton; in 1863 it fell to 17*s.* 6*d.* a ton. That was the lowest average price in any year?

Yes.

1005. That is the price of the coal in the Pool?

Yes.

1006. Do you include in that calculation the price of coal brought by railway?

At the present time the prices of coal brought by railway are somewhat lower, the coal brought by railway being of a lower character than that brought by sea; but taking the value of the coal and the cost of transit, they are nearly equalised. The north country coal is better than the Midland Counties coal.

1007. Do you put the value of the coal at the Pool and the value of the coal at the railway as nearly the same?

As nearly the same.

1008. But you say that the coal brought by railway is, generally speaking, inferior?

Comparatively inferior. In 1864 the price of coal was increased to 19*s.* 7*d.*, in 1865 to 20*s.* 2*d.*, and the last year to 20*s.* 1*d.* In consequence of the great diminution of the cost of coal since the year 1838, the development of manufactures in London, especially at the east end, has very largely increased, adding proportionately to the population and to the general prosperity. Previously to 1838 the manufacturing suburb of London, say Millwall and Limehouse, scarcely existed; it was a marsh; that was due to the high price of coal, which prevented

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* Since the introduction of coal by railway to London and the introduction of screw colliers, the price of coal has greatly diminished in London.

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prevented London from entering into competition with some of our towns in the north more favourably situated as regards the cost and supply of coal.

1009. Do you include the supply of coal to Millwall and Limehouse, and those places, in the 6,000,000 tons of coal which you stated was delivered in London?

I do not; but the price in London will more or less affect the price at Millwall, and especially when I inform the Committee that the large sugar refiners draw their supply from the Great Western Railway at the present time to limits beyond the radius of four miles from Charing Cross, through the City, they using Welsh coal; and the Millwall Iron Works and the Thames Iron Works Company, which consume between them nearly 100,000 tons of coal, draw their supply of coal principally from the Great Northern Railway; so that they would come within your prohibition as regards transit, if not as regards delivery.

1010. Is that coal which is used by the sugar refiners in the east end of London taken from the Great Western Railway through the streets by horses?

The sugar refiners draw their coals from the Great Western Railway by their own waggons through the streets; it is a peculiar kind of coal, and there is no convenient communication at the present time on the broad gauge with the sugar refineries at the east end of London.

1011. Could not that coal be taken by the Regent's Canal?

No, there is no convenient communication between the Regent's Canal and the Great Western Railway; and the cost of placing it on board a barge and taking it out again and bringing it by cart to the doors of the sugar refineries would be a more expensive process than by carting it direct from the depôts at Paddington.

1012. Where are the sugar refineries situate?

In Whitechapel and Mile End.

1013. Away from the banks of the Thames and any canal?

Away from the banks of the Thames, two miles from the canal, and some miles from a railway.

1014. *Lord Steward.*] Are you correct in stating that the Thames Iron Works Company cart their coal from the Great Northern Railway?

The Thames Iron Works Company informed me through their secretary some time since that their principal supply of coal was carted from the Great Northern Railway.

1015. Speaking of the present time, are you correct in stating that the Thames Iron Works Company cart their coal from the Great Northern Railway?

I cannot speak as to the present time; I am speaking of the last Session of Parliament, when I gave evidence upon this point, and that was the statement I made then.

1016. Are you not aware that a railway runs at the very outside of the fence, which is the boundary of the ground on which the Thames Iron Company's Works are built, and that there is a station there where all their coal is unloaded?

I am aware of that fact, but until recently I believe the Great Northern Railway Company had not had running powers or traffic arrangements in coal over that portion of the Great Eastern line of railway; and I know that the cost of carrying coal over a line of railway not in connexion with the line that brought it, is frequently more expensive than carting through the streets of London.

1017. Do you adhere to the statement that, at the present moment, the Thames Iron Works Company cart their coal from the Great Northern Railway?

No; because I am speaking of what I was informed was the case last year. The Millwall Iron Works Company have their coals direct by sea, and the Thames Iron Works Company could obtain their coals by sea; but I have reason to believe that the Thames Iron Works Company obtain small coal by contract, from a variety of merchants' yards, which they have conveyed to them by means of carts.

1018. Are you aware that the Thames Iron Company can get any quantity of coal at their wharf?

Yes; but I doubt whether they could get it cheaper than they obtain it at present, because screw steamers cannot go up the creek. Since the year 1856, when coals were at the lowest in London, the price of coal has gradually risen and is still rising in price, owing to the increased cost at the pit's mouth, due in a great measure to the result of strikes and limitation of supply. It is not owing to the increased profit of the coal merchant here, for competition is greater now than ever. Freights upon the average are lower, in consequence of the very low rates at which railway companies carry coal, viz., three-eighths of a penny per ton per mile; and therefore the increase in the cost of coal to the consumer in London is at the pit's mouth; and the increase of cost at the pit's mouth has been of late years in the same ratio as the reduction of cost by screw steamers and railway. Should the price still continue to increase, the inevitable tendency will be to drive from London the trade in iron shipbuilding and sugar refining, requiring very large quantities of coal at small comparative cost. I have read the clauses in the Traffic Regulation Bill, and am of opinion that it will be impracticable to restrict the loading, transfer, and delivery of 14,000 tons of coal daily (the estimated amount delivered within the radius) to the hours named in the Bill, namely, one and ten o'clock in the morning. From the increase of competition, and from the natural yearly expansion and increase of the coal trade, and from the system of dispatch that is now universally required in the delivery of coal, 12 hours a day are, as a rule, insufficient at times for the requirements of the trade. The undoubted effect of limiting practically the hours for the dispatch of business in the coal trade to four hours, namely, between six and ten in the morning, would be to increase the cost to the public very materially, say from 2*s.* 6*d.* to 5*s.* per ton, even if it was practicable to conduct so vast a business in this limited time. Such limitation would derange materially the facilities afforded by docks and railways in the dispatch and delivery of coal for distribution in London by coal merchants. The docks and railways do not open their doors till six in the morning to let out coal. The coal comes by railway during the night, and is ready for delivery at six in the morning, but not earlier. An increased cost of 1*s.* per ton on the estimated quantity delivered yearly within a radius of four miles from Charing Cross, namely, 4,200,000 tons, would amount to 210,000*l.* yearly. The undoubted effect of increasing the present price of coals, say 3*s.* per ton, would be immediately to stop the expansion of the manufacturing trade of London, and create great injury to its interests at a time when every facility should be given to enable London successfully to compete with towns more favourably situate as regards the cost and supply of coal.

1019. Lord *Stanley of Alderley.*] What you have stated is upon the supposition that the delivery of coals would be prohibited in all the streets of London through the whole area prescribed by the Bill?

No; practically the trade for many years, for their own convenience, and for the convenience of the public, have not delivered in the main streets of the metropolis, including Oxford-street, the Strand, Holborn, and Regent-street, after eight in the morning. The coal trade have what they call their turns, and all parties in those prohibited streets have their coals delivered before seven or eight in the morning, and then they reserve a second, third, fourth, or fifth turn for the localities beyond.

1020. Do I understand you rightly, that you practically have desisted from delivering coals in all the great thoroughfares in the City after the hour of ten in the morning?

Yes.

1021. Do you see any objection to those streets being specified, and you being by law prevented from delivering in them at a later hour than that which hitherto, by practice, you have been limited to?

I do not.

The Witness is directed to withdraw.

MR. SEYMOUR CLARKE, is called in; and Examined, as follows:

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1022. *Chairman.*] You are the General Manager of the Great Northern Railway?

Yes.

1023. Will you be kind enough to state to the Committee your objections to this Bill?

We feel that the restrictions imposed by the proposed Bill before the Committee will be such as will very seriously affect the convenience of the public with respect to the delivery and collection of goods in the metropolis.

1024. Will you point out to which clauses, more particularly, you refer?

Your Lordship is aware, no doubt, that many of the railway companies, the Great Northern being one, have provided themselves with a vast number of horses, carts, and men to attend them, and they do the service of collection and delivery themselves. Other companies employ agents throughout London, such as Pickford, Chaplin & Horne, and so on, but the Great Northern Company do the work themselves, and therefore I can speak practically as to the inconvenience which would be imposed on the public if these restrictions as to the hours during which goods are to be delivered and collected were to become law; and following what Mr. Scott has just told your Lordships, I can confirm what he states about the inconvenience which the public receiving coals would suffer, because some few years ago, before the Court of Chancery prevented the Great Northern Company from being coal merchants, we ourselves were, I suppose, the largest deliverers of coal in London. We had our own teams for that purpose, and therefore we know practically the inconvenience which must be imposed upon the public if the restrictions proposed by the Bill were to be carried out; and I concur with Mr. Scott in saying that it would be impossible for the coal consumed by the public of London to be delivered if the delivery were confined to the hours which the Bill points out. And I confirm also what he says with respect to no deliveries taking place in the leading thoroughfares of the metropolis, by consent, during certain busy hours of the day; but then of course the carts and horses are employed in the less crowded portions of London in delivering there, where no inconvenience is suffered. And what we are very much afraid of is, that if the powers of the Commissioner of Police, as they are stated here (because I gather that the powers vested in the Commissioner of Police are intended to give a certain relief), are intended to secure certain alterations, and if those are intended as a relief to those engaged in the collection and delivery of goods, the routine necessary to get the consent of the Commissioner of Police, reading Clause 13 of the Bill in connection with Clause 6, will frustrate that intention. Clause 13 says, "The Commissioner of Police of the metropolis, with the approval of the said Secretary of State and the Commissioner of City Police, with the consent of the Court of Mayor and Aldermen. and subject to the approval of the said Secretary of State, may from time to time make regulations to be observed by all persons within the special limies of this Act." I suppose that the intention of that is to meet what is prescribed in a previous portion of the Bill, namely, Clause 6, which says, "No coal and no casks, whether empty or full, shall be loaded or unloaded on or across any footway within the limits of the first part of this Act, except between the hours of one and ten o'clock in the morning, or in such back streets or other bye-ways as may be approved by the Commissioner of Police."

1025. Earl *De Grey.*] Are you aware that Clause 13 applies only to the special limits and not to the whole area?

The special limits of the Bill, if I mistake not, include a circle, of which the centre is Charing Cross, and the radius of which is four miles from Charing Cross. The railway companies, in order that their operations may be carried on with some amount of concert, have what is called a delivery map, and there is a certain coloured portion of that map where goods are to be delivered at a certain price, and beyond that limit at a greater price. The four miles radius here practically covers the whole area of London, because it is eight miles from point to point, of which Charing Cross is the centre; and what the Commissioner of Police has power to control, or rather what the Bill controls, and what the Commissioner of Police has to regulate, includes the whole area of London.

The Chairman explains to Mr. Seymour Clarke the relation of the Special Limits Clause to the rest of the Bill.

Mr. *Seymour Clarke.*] I am afraid that the restrictions are prohibitory in the way which I will endeavour to explain. Railway companies run goods trains at high speeds in the night, almost as fast as passenger trains, for the purpose of bringing goods from the manufacturing districts to London at a certain time, in order to meet our carts and teams, which are waiting at the depôts, the object being to deliver those goods with the greatest amount of dispatch. If they are not delivered in order to be of use for the merchant or tradesman that day, they cannot be of any use till the next morning. The system of trade is such now that a vast amount of it is done by telegram. The orders go down on the evening of the day to Yorkshire for certain goods to be despatched for delivery to execute an order next day. If we could not deliver those because there was a great press of business (supposing the train happened to be half an hour late, and if we were to be met by the Commissioner of Police with an order to say you shall not go into Bread-street, or Friday-street, or Thames-street), the whole day would be lost; either we should not start from our depôt at King's Cross to deliver the goods, or if we did, we should be stopped, and have to take them back again. All that means money: it means money to the tradesman, not being able to execute the orders which without those restrictions he would have been able to execute; and it means money in what we should be obliged to charge for attempting to deliver, and having to take them back, or leaving the goods in our warehouse (for space in London is so valuable an item, that you cannot keep warehouses for the reception of goods that ought to go into the warehouses of the merchants), because we could not deliver them, having done all we could, and having run at a very high rate of speed, in order to deliver those goods as expeditiously as possible.

1026. Lord *Stanley of Alderley.*] Would not those restrictions apply to bulky goods, and not to smaller articles?

I think they would apply to everything.

1027. What clause applies to small as well as bulky articles?

Clause 13, paragraph 2. The limitation of Clause 6, taken in its limited sense, would be a very serious impediment. The Registrar of the Coal Exchange has told you his views as to the coal trade in general. I have endeavoured to give your Lordships my views as to the coal trade in particular, and I know, of my own knowledge, the difficulties that would be created if that clause were to become law. With regard to casks, it says that no coals or casks are to be delivered except between the specified hours. Perhaps the framer of this Bill did not recollect that it is not only casks of beer or casks of wine which are so delivered; but there is an immense amount of commodities for the consumption of London carried in casks; not only wet goods, and fish, and things of that sort, but an immense amount of dry goods is carried in that way,—vegetables, hardware, and sugar,—and I am really afraid that the difficulty which would be placed upon the trade of London, and upon those engaged in carrying commodities for the consumption of London, would be very seriously felt.

1028. Practically, at present, coals are not delivered, except in the early hours of the day, in certain great thoroughfares, where the greatest traffic exists, such as Oxford-street and the Strand, and so on; would it meet your views, and not interfere with the carrying on of your traffic, if the same regulation was to be applied generally to all bulky goods, and you were only prohibited from delivering them in the great thoroughfares of the metropolis, the rest of the metropolis being left to the regulations which at present exist?

I think that orders might be given, under the powers of this Bill, to prescribe the route that traffic passing through London should take after a certain hour. For instance, we have a great deal of communication between the North and South of London; we have communication with the docks on the Surrey Canal, a very large interchange of traffic indeed. I see no difficulty in prescribing that a certain route should be taken through less crowded thoroughfares than those where the traffic is so great, and that might be done without

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inconvenience to anybody. More time would then have to be taken in the delivery of those goods, and regulations would have to be made on the subject. I do not wish the Committee to understand that any factious difficulties would be made by the Railway Companies or carriers, but knowing the thing so intimately as I do, I wish to point out that what the framers of this Bill are endeavouring to do for the sake of benefiting London, would have a contrary effect if the restrictions laid down in the Bill were to be enforced.

1029. Do you not contemplate the probability that a great amount of the transit through London, at present, taking place from railways in the north to railways in the south of London, will be eventually conducted by means of subterranean railways?

Yes; and as evidence of that the Great Northern Company have subscribed to the formation of that link, to connect the Metropolitan Railway with the London, Chatham, and Dover; we have subscribed 300,000 *l.* towards that, with the view of getting railway trucks through London to the south side. But I wish to point out that we, in common with all other railway carriers, have an immense number of receiving-offices throughout London where people can deliver their goods, and then the carts come and collect them. We have such receiving-offices at Regent Circus, Holborn, Oxford-street, Cheapside, and in out-lying places, such as Knightsbridge, and at the extreme end of the City, Whitechapel, and no amount of railway communication through London would prevent those being in operation. Then, if people are all day delivering packages, casks, or boxes, and if our cart when it comes to Regent Circus, for instance, to collect those packages may not stand there to receive them, those goods of course cannot get to King's Cross to be forwarded, whether to the north or any other part of the world. That is a thing of ordinary occurrence.

1030. *Chairman.*] You say that you bring up your goods from the manufacturing districts for delivery in London by fast trains in the evening; between what hours in the early part of the morning do you send most of those goods out for delivery?

For Billingsgate and Newgate Market, and Leadenhall Market, we begin extremely early, because the present police restrictions endeavour to prevent the accumulation of traffic in the City. Those deliveries begin as soon as the trains arrive, at three, four, five, or six o'clock; but it is of no use to deliver bale goods earlier than the people are at their warehouses to receive them, and if we deliver them by nine it is an early delivery; the bulk of the delivery of those goods would be between 9 and 11: those goods are sold that day. Those men to which those packages are delivered, execute orders by receiving the goods, and subdividing them among their customers, and sending them out again. We call at houses in the evening to collect goods to dispatch them by the railways in general. From inquiries which I have made, I hear that the Committee will not take any railway evidence after to-day; therefore I am anxious to impress upon your Lordships, not only the Great Northern case, but the case of the railway companies in London; and the Great Northern business is not one of the largest; at any rate, our business is not to be compared with the business of the London and North Western Company, which is very much larger, and covers a much larger extent of the northern parts of England.

1031. You say that you deliver the bulk of your bale goods between 9 and 11 o'clock in the morning?

Yes, if we can; but supposing that a casualty happened, if the consignees could not receive them after 10 o'clock, which means leaving King's Cross at nine o'clock, we could not deliver them that day.

1032. Supposing that Regent-street was included within the special limits under paragraph 2 of Clause 13, and that you could not deliver there after 11 o'clock, but that you could deliver in all the neighbouring streets, could not you arrange your deliveries so as to deliver goods in that particular street, Regent-street, before the prescribed hour, holding the other goods back for delivery in the streets not within the special limits, till afterwards?

No doubt we could, in the same way as coals are delivered (as your Lordships were told by Mr. Scott) in the less crowded thoroughfares, in the latter part of the day; but it would damage the whole of the trading property in Regent-street if it were known that the tradesmen there could not get their goods with the same convenience as tradesmen in other parts of town. You can only limit beneficially the passage of goods through certain places so as to get to more distant places. But I see a very great difficulty in taking away the power to deliver to a tradesman because he happens to live in Regent-street, and who would by that limitation be placed in a worse position than another tradesman living in the neighbourhood.

1033. Lord *Stanley of Alderley.*] If that limitation only applied to the delivery of the heavier description of goods, it would not be productive of much inconvenience, would it?

No; but the definition of that heavier description of goods would be extremely difficult.

1034. There is an attempt at a definition in Clause 9, as to certain lengths and a certain description of things?

That I am afraid is a very imperfect definition, with all deference, because it prescribes the length which articles may project beyond the vehicle; you may widen the vehicle to any extent you please, and thereby increase the size of the package that may be delivered.

1035. Lord *Houghton.*] Is not the tendency, owing to the present regulations, towards the delivery of heavy goods early in the morning?

Yes; and it is to our convenience that we should deliver as early as possible, so as to avoid getting blocked; and also, for the same reason, we take the less crowded thoroughfares, because if we were to attempt to force our way along Cheapside, and such thoroughfares as that, we should be blocked up.

1036. Would you object to any limitation of time, supposing that the hour fixed were, for instance, 12 o'clock instead of 10 o'clock?

I would rather have a regulation to this effect, that a certain route should be prescribed for passing through London, so as to keep those bulky goods out of the way of the general business of the metropolis.

1037. Do you think that any route could be prescribed so as to avoid the crowded streets?

I think it could; for instance, it should be provided that the New-road should be taken (which since the opening of the Metropolitan Railway has had much less traffic upon it) rather than Oxford-street.

1038. *Chairman.*] How would the police distinguish between through-traffic that was to go from one side of London to the other, and traffic to be delivered somewhere in the heart of London?

There would be no difficulty there, because every carman carries a document which shows where the goods are going to; whether he is carrying 50 packages to different houses, or a boiler to a manufactory, he has a document showing where the goods are going to. No carman goes with his goods without having the means of satisfying the police as to his destination, if they had authority to demand his credentials.

1039. Would that apply to other businesses, such as the business done by the Surrey Commercial Docks, for instance?

Yes, and to the coal trade also; because every carman with a load of coals is bound to have a document showing the weight of the coals, and where they are going.

1040. Lord *Stanley of Alderley.*] Will you state to the Committee those streets in which you now practically confine the delivery of coals to an early hour in the morning?

I cannot give the names, but I can confirm what Mr. Scott has told your Lordships, namely, that it is understood that the deliveries are to be made in the crowded thoroughfares first; it is no uncommon thing to see coals delivered at the west end of the town at a much later hour of the day than in the crowded thoroughfares.

1041. What directions do you give to the carman?

It is done in the way which Mr. Scott has described, that is to say, by turns. When we used to deliver coals (and no doubt the same thing goes on now), coals were ordered by the public by post; letters came in by the hundred,

dred, and a registration was made of them, and except with those restrictions which Mr. Scott has mentioned, the first coming order was delivered at the most convenient time of the day, and those whose orders came in later, if they got them that day, would receive their coals at a more inconvenient hour of the day; and if ten o'clock were to be the hour after which no delivery could take place, and one o'clock the time for beginning, the inconvenience will be very great; of course the public might expect to have their servants called up to receive the coals at any hour between one and ten.

1042. Lord *Stanley of Alderley.*] You have said that now, practically, you do not deliver coals after ten o'clock in all the great thoroughfares of London; which do you consider those thoroughfares to be to which you so restrict yourselves, and how are they indicated to the carman who delivers the coals?

I could furnish that information to the Committee; I would wish to call your Lordship's attention a little more particularly to the convenience which the public now have, the want of which would be very much felt, in the offices which we have established all over London. If we were to be prevented delivering goods or collecting goods from them, it would be a very serious impediment; I mean, if the Commissioner of Police had the power to say that a cart should not stand there to take in goods. I am afraid, although it is a small matter, apparently, to say that goods shall not be taken to a receiving house, still the thousands of packages dealt with every hour of the day make it an important matter. It is not that we call at these offices once or twice a day; but there is a constant succession of carts calling and taking the goods to the stations, where they are loaded up for dispatch. Our waggons are loading all day long; packages come in containing all sorts of goods for all sorts of places, and there are different railway waggons waiting to be loaded up, those collections being made up throughout the day; and we could not confine our operations to the hours to which this Bill would limit us.

1043. *Chairman.*] Are the receiving houses of the railway companies generally in the more crowded thoroughfares of London?

Yes, they are, and that is one of the mischiefs; they are obliged to be so, because if they were not so the public would be inconvenienced by having to go to bye-streets to take their goods.

1044. If the public knew that the receiving house was in a bye-street, in the immediate neighbourhood of a crowded thoroughfare, would it put them to much more inconvenience to turn a little way out of that thoroughfare?

The great object which all the companies have in view is to give as much convenience to the public as possible; and if it could be shown to be a convenience to the public for them to go into those bye-streets, they would, I dare say, go to the inconvenience of establishing receiving houses in the bye-streets; but the receiving houses are old-established places, owned by the companies, or taken on long leases by them, and having all the conveniences necessary for the collection and delivery of goods.

1045. Lord *Stanley of Alderley.*] Are you, by the Bill, prohibited from taking goods to those places?

By the 13th clause, paragraph 2, we are.

1046. Earl *De Grey.*] In your choice of those places you have been mainly guided, I presume, by the convenience of the public?

Entirely.

1047. Lord *Stanley of Alderley.*] Paragraph 2 of Clause 13 is not a prohibition; it only gives the Commissioner of Police power to prevent your taking goods to those places?

I am afraid that with the knowledge which we have of what policemen do, it would be found to amount to a prohibition.

1048. *Chairman.*] The police can only act subject to the Secretary of State?

I am aware of that; they can only make general rules, and in order to make those general rules consistent with the object of the Bill, those rules must be very stringent, or they would be useless according to the frame of the Bill.

1049. Earl of *Airlie.*] You said that you would not object to regulations being made as to traffic passing through London?

No, it is a thing which could be done without difficulty, and with no inconvenience to anybody.

1050. Is not the main obstruction caused by waggons loading and unloading in the streets?

I do not think that you can ever do away with that. I do not think it would be possible for the enactments of this Bill to be carried out.

1051. Admitting that to be the case, your proposition as to the regulations of the through traffic would not meet the difficulty?

It would not meet the whole difficulty, but it would meet a great portion of the difficulty. I think that a great deal of the obstruction in the streets of London at this moment is in the crossing of the thoroughfares by waggons and carts going in different directions to distant places.

1052. Earl of *Kimberley*.] Do you think it would be possible to make any definition as to the size of casks, so as to meet the difficulty as to deliveries?

No; I am afraid that the difficulty is in that power to prevent packages being taken across, or placed on a thoroughfare. I do not know whether your Lordships have had any evidence as to the Metropolitan Meat Markets and the streets adjoining. The crowded condition of all those thoroughfares is such as to be a subject of very great discontent on the part of those who have to deliver goods; we are detained constantly by the Commissioner of Police, but we cannot help it; we do our best, and we fear, from what has passed under the existing state of things, that if we are to be fined in the way proposed here, we shall have to carry on our business very differently to what we do now, and that the public convenience will be very severely prejudiced.

1053. Lord *Stanley of Alderley*.] Will not the condition of things, now existing in the neighbourhood of the meat markets, be altered when the new dead-meat market is established?

Yes; but if the meat market is central in Smithfield, the approaches to that market would be terribly thronged. It is like the old story which has been before Parliament so often as to whether a central station could not be carried out. I have ventured to say, on one or two occasions, that I did not think it could. I am sure that in many instances which this Bill is provided to meet, 24 hours would be lost in the delivery of goods to the tradesman, preventing him from expeditiously carrying out his orders. In the trade of England there is so much competition in time, and competition in the way in which orders are executed, the railway companies being forced into the same competition, that it would become a serious grievance if, after all their exertions to execute their orders, they were to be prevented from executing them by the restrictions imposed by this Bill. Your Lordship asked me as to the time at which goods can be delivered in London; as to bale-goods and things of that sort, we have certain regulations throughout the manufacturing districts that we will take goods in, only up to a certain time; the object of that being, that we shall have as reasonable a time in which to deliver the goods the next morning, as it is possible under all the circumstances of competition to have, and we receive those goods up to a certain time in the evening. At Leeds, for instance, or Bradford, goods that have been packed after orders by telegraph, have been received two or three hours before, we will not receive after a certain hour, the object being, that we shall be obliged to make our delivery in London at a certain other time. Then, if we cannot make the deliveries in London, we cannot start from Yorkshire, the goods cannot be sent that day, and that is how I illustrate my notion (and I firmly believe that it would be the result) that 24 hours would be lost in the execution of the orders and the delivery of the goods. If the Committee wish, I can give them the details of the number of deliveries which we make, the number of horses and carts which we use, the amount of fish carried, and the amount of meat carried; a large amount of the provisions brought to the Metropolis, is carried by railway.

1054. Earl of *Kimberley*.] Is there not some considerable inconvenience experienced from the delivery of fish under the present regulations in the City?

Yes, there is, and that is owing to the crowded state of Billingsgate; we cannot control the delivery of fish as we can bale goods, because, if the winds in a particular district on the east coast are contrary, the fishing-boats cannot get in.

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in. A great many steam-tugs are used to bring them in. The fish does not come on shore till late, and we are obliged to send it by special trains when so brought to us; and if we were prevented from delivering that fish in casks, it would either be destroyed or we should refuse to carry it.

1055. Supposing several large vans with fish arrive in the middle of the day at the market, and it is impossible for them to unload at once, are they liable to a penalty if they remain in the street and do not unload?

Yes, and there are numerous fines inflicted in consequence.

1056. In fact those fines, though they are in accordance with the law, are a great hardship upon the drivers of the vans, because they have no alternative but to remain?

They are a great hardship, and they are inflicted after the very utmost endeavours have been made by the carrying company.

1057. Lord *Stanley of Alderley.*] Is not fish usually delivered early in the morning?

Yes; it is essential that it should be so; five o'clock is a late delivery of fish; if a glut of fish come in it has to be delivered.

1058. But, practically speaking, the great delivery of fish throughout the Metropolis takes place in the morning?

Yes.

1059. The arrangements at the fishing ports are timed to suit your arrangements for that purpose?

Yes. There is another matter which I wish to mention with regard to the delivery of goods in London; bales of goods are carried, as your Lordships are aware, in very large quantities for wholesale houses; the carman has a great deal to do in a little time; he throws a bale off his cart, and it rests on the pavement. Suppose the foreman at the warehouse is busy, and he says, "I will not take it in," according to the framing of this Bill we should be liable to a penalty, because we have placed it there with the idea that the bale was going to be taken in. If the warehouseman will not take it in, the railway company is liable for having pitched it on the pavement.

1060. *Chairman.*] Would not the warehouseman be liable, and not you?

No, I am afraid that it would be the carman.

1061. Lord *Stanley of Alderley.*] From the tenor of your evidence I gather that your objections are in respect of the inconvenience that would be produced by the regulations which would be made by the Commissioner of Police rather than to the positive enactments in the Bill?

I am afraid that I have made myself very badly understood. My first objection to the Bill is as regards clause 6, which says that no coal or casks shall be loaded or unloaded except between the hours of six and ten o'clock in the morning. The next is to the enactments of clause 9, which are specific; and then I object to the general enactments of clause 13; those are the three things which are most grievous to us.

1062. *Chairman.*] In point of fact, with regard to clause 13, as I understand you, you do not object so much to the route being prescribed as to the second part of the clause, which prescribes the period of the day in which carts should be allowed to remain in any street for the purpose of loading and unloading?

Yes, because that will affect us at all the delivery offices. If the police were minded to make such restrictions as they would have power to do, it would prevent our carrying on our trade.

1063. Lord *Stanley of Alderley.*] Your impression is that the police would make vexatious regulations?

I do not know that I am justified in saying that they would make vexatious regulations; they would have the convenience of the walking public in mind, forgetting the large amount of inconvenience which would be suffered by tradesmen and manufacturers.

1064. Those regulations are only to be enforced after they have been sanctioned by the Secretary of State. Do not you think that the great railway companies and people inconvenienced by those traffic regulations would have quite sufficient power to make their grievances heard in Parliament?

I am

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I am afraid that we should have no appeal; I am afraid that the Commissioner of Police and the Secretary of State would not consult the railway companies.

1065. *Lord Steward.*] What is the amount of your business in collecting and delivering goods throughout the metropolis?

With regard to the number of vans and vehicles and horses and carmen we employ for the purpose of collecting and delivering goods within the limits of the first part of this Act, 185 vans and vehicles, 561 horses, and 370 carmen and vanguards; those are distributed between King's Cross, the City depôts, and the west-end offices. Then our deliveries average 170 loads every day after the hour of 10 in the morning, and the collections average 47 loads daily after the hour of 10, irrespective of those brought from our own depôts in the City. Then we have receiving offices at Holborn. Oxford street, Regent Circus, and Bridge-road, Westminster, collections from which may average 50 loads daily after the hour of 10 in the morning. In order to illustrate what I said about casks not always being beer or wine casks, glass, hardware, provisions, fresh and cured, dry saltery, groceries, including sugar and various articles of commerce of that sort, which are constantly delivered in casks, and the practical difficulty in the restriction would be, that supposing a waggon went from King's Cross with a load of casks and 50 articles not casks, we might have to carry those goods all over London, and when it had passed the hour of 10 we might have to bring those casks back again to King's Cross, because we could not deposit them any where, and it would be impossible to decide, when a load was being made up at King's Cross, whether the casks should be put in or not. It would be impossible to deliver generally through London in the same way as we do now, with the restrictions which this Bill seeks to impose.

1066. Earl *De Grey.*] Do you see any distinction between casks and square boxes, and other descriptions of cases containing goods, so far as the object desired to be attained by clause 6 is concerned?

No. I can only imagine that the framers of this Bill have been inconvenienced or seen the inconvenience caused by the delivery of brewers' casks, necessitating the opening of trap doors and the obstruction of the footway by ropes; that is the only reason which I can imagine why casks should be associated with coals.

1067. That mode of delivery which applies to beer casks does not apply to the delivery of casks of other descriptions?

No. I mentioned that the London and North Western Railway Company are much larger carriers of goods than we are. Mr. Mason, one of the managers of the London and North Western Railway, is in the room at this moment, if your Lordship would wish to examine him; or perhaps he would endorse what I have said about the inconveniences which would be imposed upon the public.

1068. Lord *Stanley of Alderley.*] Is the Committee to understand that, as far as your coal traffic is concerned, you do not think that it would inflict much injury upon you if you were to be limited to the hours named in the Bill, for the delivery of coals in the great thoroughfares of the town, and that you see no objection to those thoroughfares being defined?

I think that they could be defined with considerable advantage; but I should not like to say, without the concurrence of the parties immediately interested in the matter, that such a list of streets could be embodied in the Bill, because one street might be the access to the other. But if your Lordships would condescend to receive such a statement, there would be no difficulty in defining the streets in which coal should not be delivered after a certain hour.

1069. Would the Committee be right in supposing, also, that you see no objection to regulations with a view to governing and directing the traffic through the Metropolis?

I see none

1070. But on the contrary you see considerable advantage attending it?

I think that there would be a considerable advantage in it.

1071. Earl of *Kimberley.*] Which do you think would be the most convenient, that certain streets should be defined in the Act itself, as the streets in which certain

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certain operations of trade should be prohibited, or that a general power should be given to the Commissioner of Police, subject to the approval of the Secretary of State, to make such regulations with regard to those matters as might appear convenient.

I think the more important streets should be defined. With regard to clause 9, I think the definition in paragraph 1 would be open to a very great amount of dispute, and I think the definition of a street in clause 4 is hardly consistent with clause 6. Clause 4 says, "a street shall include any highway or other public place, whether a thoroughfare or not;" but clause 6 says, "between one and ten o'clock in the morning, or in such back streets or other bye-ways as may be approved by the Commissioner of Police," so that the two clauses seem to be hardly consistent with one another.

1072. Earl of *Airlie.*] If clause 6 were modified so as to allow you to deliver goods after five in the evening, as well as before ten in the morning, would that meet your objection?

It would be better, no doubt; but the hour of ten, I think, wants extending: I think ten o'clock is a very early hour indeed, if it were extended to twelve it would mend the matter.

1073. *Chairman.*] Clause 6 only applies to coal and casks?

I am afraid the definition with regard to time in clause 6 would be taken by the Commissioner of Police rather as an instruction in applying clause 13. If parties interested were to be heard before any of those regulations were made it would be a very beneficial thing.

1074. Earl *De Grey.*] It has been stated in evidence to this Committee that the present practice of railway companies of only allowing their own privileged cabs to ply for hire in their stations is open to objection, and that it would be more for the convenience of the public if railway companies were to allow any cab to ply for hire in their stations?

We adopt the practice for the sake of the public convenience; supposing we have three or four of the large and respectable cab proprietors who are required to paint their cabs a certain colour with our initials upon them, they are bound to have respectable men and vehicles ready to meet every train, and at whatever time a train comes in, whether a good train or a poor one, a certain number of cabs are there, and those cabs have the *entrée* to our station, but the practical effect is that, in Maiden-lane, and that wide space opposite King's Cross, there are always a number of cabs ready and anxious to be called in; we insure that the public shall have some cabs, and when the number of passengers arriving gives the chance of other cabs being hired, there are plenty of them ready and anxious to be called in; the public gain by it, we do not gain by it.

1075. Lord *Stanley of Alderley.*] The company receive a payment from the cab proprietors, do they not?

Yes, but the company provide certain men to regulate those cabs; we make no profit out of it.

1076. *Chairman.*] When your own privileged cabs are exhausted, do you allow other cabs to come in without payment?

Yes.

1077. Earl of *Kimberley.*] The objection to the practice in question was not that the public were inconvenienced from an insufficient supply of cabs at the stations, but that they were inconvenienced by the obstruction to the traffic which was caused by unprivileged cabs being obliged to leave the railway stations, instead of being allowed to remain there to ply for hire. A cab proprietor who gave evidence before the Committee upon that point, alleged that, in consequence of that custom the cab is obliged to depart through the streets to find some other cab stand?

Practically that is not the case; your Lordship recollects King's Cross Station well enough to know the arrival side and the departure side; it is no use a cabman waiting at the departure side to take up a fare, when he has put down his fare he goes out. If he is privileged he stands inside, if not he stops outside at the stand, and takes his turn when the privileged cabs are exhausted. The public get this advantage, we insure a proper quantity of cabs to take them away; that is the case all over the country, if we did not give that privilege to inn-keepers and cab proprietors, they would only send cabs at the time when they would be sure of being employed, but when we give the privilege to innkeepers or cab proprietors to send their cabs into our yard, it is to insure that the public shall be served, and that it shall not be left to the caprice of the cab proprietor.

1078. Lord *Stanley of Alderley.*] We are informed that at the South Western Railway a different practice prevails, and that there are no privileged cabs there; but that any cab taking a fare there may wait to take up a fare from an incoming train, and that there are always a sufficient supply of cabs there, and even a larger supply than at the stations where the cabs are privileged?

I cannot speak to their practice; I can speak as to our own. I know that it works beneficially to the public, and it is no pecuniary profit to the company.

1079. Earl *De Grey.*] Have there been any occasions on which the public have been inconvenienced from there not being a sufficient supply of cabs at your station?

No; when I say there have been none, it is a very rare occurrence indeed.

The Witness is directed to withdraw.

MR. CHARLES MASON is called in; and Examined, as follows:

Mr. *C. Mason*

1080. *Chairman.*] HAVE you any observations to make to the Committee in addition to what has been stated by Mr. Seymour Clarke?

No, I think that Mr. Seymour Clarke has fully and fairly stated the railway case. If your Lordships would hear our agents, Chaplain & Horne, and Pickford, who are more immediately brought into connection with the public in the streets, they could give valuable information and suggestions; and perhaps your Lordships would be good enough to hear some of the warehousemen and traders who receive goods, gentlemen having large establishments in the neighbourhood of St. Paul's, Friday-street, and those narrow thoroughfares in and about the City. We had a meeting with them yesterday, at our offices, and they have a very strong case against some of the provisions in the proposed Bill. But as regards the railway case, I will not overlay it, but I confirm generally what Mr. Clarke has stated; and we should be very glad indeed to see a Bill passed which would assist in the regulation of traffic, particularly traffic that passes to and from particular destinations. We should be very large gainers by any measure that facilitated the passage of the traffic through the streets. And with regard to bulky articles, articles of very great weight and length, we have no objection to offer to restrictions being placed upon the conveyance of those articles during the middle of the day.

The Witness is directed to withdraw.

MR. WILLIAM SMITH is called in; and Examined, as follows:

Mr. *W. Smith.*

1081. *Chairman.*] WHAT is your business?

I am a Bill Inspector of the Royal Italian Opera and a Bill Poster.

1082. On what point do you appear before the Committee?

I wish to call the attention of the Committee to the number of men that would be thrown out of employment if clause 11 were to be passed, which prohibits the carrying or distributing of any picture, print, board, placard, or notice. During the season there are employed daily 1,000 boardmen, "sandwich men," as they are called, carrying boards back and front; and during the winter 600 daily; each of those would distribute 200 handbills daily, and 1,200 double crown bills; the average delivery of double crown bills every Monday is over 100,000; 300 men being employed, at a salary of about 1 *l.* a week, in delivering those bills. There are 47 theatrical printers, 77 window picture bill deliverers, 68 bill inspectors, and 68 bill posters, employing a great many men; in June last they employed 486 men. Altogether, 2,000 persons would be thrown out of employment.

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1083. What do you pay the "sandwich men"?
One shilling and sixpence a-day.

1084. What class of men are they?
Generally elderly men who have seen better days; some are broken-down tradesmen.

1085. Lord *Houghton.*] At any rate, it would be a very great immediate hardship if those men were thrown out of employment?
Yes; they were stopped some 18 months back, and Lord Shaftesbury interested himself in the matter; and through his interesting himself in the matter, Sir Richard Mayne allowed them to go out again.

1086. *Lord Steward.*] They are prohibited from walking on the pavements, are they not?
I believe they are; I always give orders to my men not to walk on the pavement.

1087. They cannot walk in the street; so that they walk in the gutter, do they not?
Yes, I believe so.

1088. Lord *Houghton.*] Where is the advantage to the public of this mode of advertising; do you think that people see those advertisements who would not get the same information through other channels?
I do not think that the large firms would go to the large expense that they do in that mode of advertising if it did not do any good; it is not only confined to the theatres, but it is adopted for advertising by the Crystal Palace, dining rooms, sermons, reading rooms, and lectures. One thing is objectionable, that is, the over-head boards; I think that they ought to be done away with, because they frighten horses, and they are too heavy for the men in a windy day. I have never sent one out myself, and never shall.

1089. *Lord Steward.*] Are those men employed in this way not capable of any other employment?
I think not. They suffered greatly when they were stopped 18 months ago; many of them were starving; two of them dropped down dead in the street; one of my men when he heard that they were stopped had a fit, and died in the street.

1090. Lord *Houghton.*] Have you any clergymen?
Not that I know of.

1091. *Lord Steward.*] Is carrying those boards hard work?
No, not carrying the boards back and front.

1092. Earl of *Kimberley.*] Would not those men be able to find employment of some kind?
The clause prohibits the distributing of bills in the streets as well, so that they could not do that.

1093. But bill-sticking would not be stopped, nor delivering boards for the shops?
This clause would prohibit delivering board bills; for, in order to deliver them to the shops, they must "carry" them and "distribute" them in the various streets; the clause says, "No picture, print, board, placard, or notice, shall, by way of advertisement, be carried or distributed." If I give out bills to my men they must carry them to the various places they are going to.

1094. *Lord Steward.*] Do you employ any of those men who deliver bills to persons going by?
Yes, I have 60 out to-day.

1095. Lord *Houghton.*] What number of bills and boards do you ordinarily send out, every day, for the opera?
We send out 500 double-crown bills every day, and 1,000 small slips; we do not send out any "sandwich men" during the opera season.

1096. *Lord Steward.*] Would the men who carry those "sandwich boards" be incapable of undertaking any other kind of work?
Two-thirds of them would.

1097. An

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1097. An old man or a man, suffering from some infirmity, could get a living in this way when he could not get it any other way?

Yes, at 1 *s.* 6 *d.* a-day; you do not find many strong, able-bodied men amongst them.

The Witness is directed to withdraw.

Mr. HENRY HAMBLETON, is called in; and Examined, as follows:

Mr. *H. Hambleton.*

1098. *Chairman.*] WHAT are you?

Missionary to the Working Men's Institute in Parker-street.

1099. Will you state your objections to clause 11 of this Bill, which relates to placards?

From my knowledge of board-men, which has ranged over some years, I believe it would be a very great hardship to them. I know that a great many of them could not take any other employment.

1100. What is the number of board-men in London?

About 700.

1101. Do most of those men carry boards, either before or behind them, or over their heads?

Yes. There is a strong objection on the part of the board-men to carry the over-head ones; they receive no more pay for it, and frequently have to carry the boards front and back as well; some get as little as 1 *s.* 3 *d.* a-day.

1102. Can you tell us what the proportion of those who carry boards bears to the men who distribute bills by hand?

They are mostly of the same class; I cannot tell.

1103. Earl of *Kimberley.*] Do you know how many distribute bills by hand?

I cannot tell; it is quite casual work. If a man cannot get work at the docks, he will go to a tradesman and get employment that way for the sake of getting a few pence.

1104. Lord *Houghton.*] Is the information which is given to the public by those "sandwich men" of an important and interesting character; is it as to anything else besides theatrical performances?

Yes; for instance, if we established soup kitchens, we could not make it known without the aid of board-men. That plan of advertising is adopted for public meetings of various kinds; philanthropic meetings, May meetings, and 10,000 purposes.

1105. It is not merely adopted for theatrical performances, but for purposes which it is really very important that the public should be well informed of?

I think so.

1106. And especially for charitable purposes?

Especially for charitable purposes.

1107. *Lord Steward.*] With regard to the printed matter which is distributed, what is the nature of that?

Some of the hand-bills are very objectionable; the men themselves dislike delivering them; but there are some men who are so hard up, that they will consent to do anything, and they will distribute bills of a disgusting nature which they have a strong objection to; bills of quack doctors, which they thrust into the hands of young gentlemen passing by.

1108. You would see no objection to the distribution of those bills being prohibited?

I think not, provided the matter is regulated by the police. If the over-head boards were confined to a given size, say 20 by 30, and they went out singly, there would be no inconvenience to the public, it would be rather an advantage.

H. Hambleton.

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1109. You would prohibit the distribution of printed matter altogether by hand, if it were of an objectionable character?

Yes; I distribute hand-bills myself of my institute, and have succeeded in getting a large number of men into the institute by that means; many men that had tramped up to London really deserving and starving. It has been the means of doing them good; it has given them a meal, at all events.

The Witness is directed to withdraw.

Ordered, that this Committee be adjourned to To-morrow, at One o'clock.

Die Veneris, 1° Martii, 1867.

LORDS PRESENT:

Lord Steward.
Earl of Airlie.
Earl Stanhope.
Earl Graham.
Earl of Lucan.
Earl of Belmore.
Earl de Grey.
Lord Methuen.
Lord Stanley of Alderley.

The Earl of BELMORE in the Chair.

Mr. SEYMOUR CLARKE, is called in; and further Examined, as follows:

Mr. *S. Clarke.*

1st March 1867.

Witness.] I have procured the information which your Lordships requested with respect to the mode in which coal merchants arrange the deliveries in London; I did not know it of my own knowledge, but I have taken this morning the best evidence which I could get, and I find that with regard to the delivery of coals in London, the mode of proceeding is that coals are delivered in the City generally before eight o'clock in the morning as a practice, and in all the great thoroughfares such as the Strand, Oxford-street, St. James's-street, Parliament-street, and so on; and that the delivery is always avoided between eight o'clock in the morning and six o'clock in the afternoon, in the crowded parts of London, so as to leave the streets clear for traffic as far as it is possible, and that the less frequented parts of London, such as the squares and the bye-streets, are supplied throughout the day.

1110. Earl *Stanhope.*] But does not the practice which you have mentioned depend upon custom and not upon regulation?
Yes.

1111. Beyond the City it depends simply upon practice, and there is no regulation to enforce it?
There is no regulation; I find that most of the coal merchants carry out some such practice as this, and that that is the result of a self-made regulation because they find that the convenience of the trade and their own means of getting rid of the work which they have to do, are promoted thereby.

The Witness is directed to withdraw.

Mr. JOHN HOWELL, is called in; and Examined, as follows:

Mr. *J. Howell.*

1112. *Chairman.*] For whom do you appear before the Committee?
I appear for the warehousemen and traders of the City of London.

1113. Earl *De Grey.*] What is the name of your firm?
Ellis, Howell, and Company.

1114. Earl *Stanhope.*] How long have you been in business?
I have been 26 years a partner in that business, and 32 years in the business altogether.

1115. *Chairman.*] Will you state to the Committee the points upon which you wish to offer observations with regard to the Bill now under consideration?
I would ask permission to place in the hands of the Committee a petition of

Mr. *J. Howell.*

1st March 1867.

merchants in the City of London against a Bill which was proposed in the year 1863; I think that it is very likely to assist the Committee in arriving at correct views on this subject, as it bears upon most of the points in the Bill now before your Lordship.

[*The Witness delivered in the following Document*: —]

LONDON (CITY) TRAFFIC REGULATION BILL.

Petition against the Bill.

To the Honourable the Commons of the United Kingdom of Great Britain and Ireland, in Parliament Assembled:

The humble Petition of the undersigned Merchants carrying on business within the City of London or the Liberties thereof,

Sheweth,

That a Bill is now pending in your Honourable House, entitled "An Act for the better Regulation of the Traffic in the Streets of the City of London, and for the Prevention of Obstructions therein."

That, by the provisions of the said Bill, it is proposed to empower the Court of the Mayor and Aldermen of the City of London (therein and hereinafter called "the Court") to make such bye-laws, rules, orders, and regulations, as they may think necessary or expedient to be observed and enforced within the City of London and the liberties thereof, for the purposes (among others) of regulating the several routes to be followed, and the particular streets or portions of streets to be used by all or any of the omnibuses, coaches, cabs, and other public or hackney carriages licensed for the conveyance of passengers, or to ply for hire; and for preventing obstructions in such streets in any case where the same may be thronged, or liable to be obstructed by reason of the balance or amount of the traffic; and for regulating the height and width to which vehicles for the conveyance of goods, wares, and merchandise may be laden, and the breadth between the outsides of the wheels of any such vehicle. And it is also proposed by the said Bill to enable the said Court to alter, vary, or repeal, such bye-laws, rules, orders, or regulations, and to impose certain penalties for the breach of the same, and also to provide that all such bye-laws, rules, orders, and regulations, or any alteration thereof, shall not come into operation until one month after the same shall have been approved under the hand of one of Her Majesty's principal Secretaries of State.

That your Petitioners are persons carrying on business of considerable magnitude within the City of London, and for the purpose of such business therein employ (*either of their own property or belonging to carriers and other persons*) a great number of carts, waggons, and other vehicles; and that it is of the most essential importance to your Petitioners in the conduct of such business, that no unnecessary obstruction or impediment should be offered to the passage of the traffic to and from their warehouses and other places of business, or to the loading or unloading of the goods forwarded to or from their respective places of business.

That your Petitioners believe that the provisions of the said Bill will be most injurious to them in the conduct of their business and the traffic connected with the same; and the said Bill will also subject them to penalties to which they are not liable under the law as it now stands.

That, under the provisions of the said Bill, bye-laws or regulations may be made by the Court, by means of which the streets now principally used by your Petitioners in the conduct of such traffic may be appointed as the routes to be followed or streets to be used by omnibuses, coaches, and the other vehicles above mentioned, and that the effect thereof would be either to hinder or materially obstruct the passage of the carts and other vehicles employed by your Petitioners along the same, and to interfere with the loading and unloading thereof respectively.

That your Petitioners are also apprehensive that the provisions as to preventing obstructions in such streets as aforesaid are of so general and independent a nature, and may be carried into effect in such a manner, as materially to obstruct, if not wholly to prevent, the carrying on their business and the traffic connected therewith.

That your Petitioners also object to the provisions which enable the Court to prescribe the height and width to which carts and other vehicles as above mentioned may be laden, and the breadth between the outsides of any such vehicles

That the bye-laws and regulations to be made for such last-mentioned purpose may not only cause great obstruction and impediment to them in the carrying on such business and traffic, but may render wholly useless the waggons, carts, and other vehicles now used and employed by them.

That your Petitioners also submit that the provision as to the approval of bye-laws, rules, orders, and regulations by one of Her Majesty's Principal Secretaries of State, is not such as to afford proper and adequate security to your Petitioners and others interested therein, and that the confirmation of the same should be subject to judicial authority, with provisions that the objections of all parties affected thereby should be properly heard and determined.

That while your Petitioners would be ready and willing to submit to any reasonable regulations, in the traffic connected with their business, which the convenience of the public may require, your Petitioners believe that the provisions of the said Bill will inflict upon them and other parties great injury and inconvenience, and are unnecessary and uncalled for, inasmuch as the powers given by the Act of the 2nd and 3rd Victoria, c. 94, if judiciously and properly exercised, would render any further legislation unnecessary.

That the preamble of the said Bill is incapable of proof.

That there are divers clauses and provisions in the said Bill, which, if passed into law as they now stand, will prejudicially affect the property, business rights, and interest of your Petitioners, and that other clauses and provisions ought to be inserted in the said Bill, if the same be allowed to become law, for the protection of the same.

Your Petitioners, therefore, humbly pray your Honourable House that the said Bill may not be allowed to pass into a law as it now stands, and that they may be heard by themselves, their counsel, agents, and witnesses, before the Committee of your Honourable House to whom the said Bill may be referred, against the Preamble of the said Bill, and against such of the clauses and provisions thereof as may affect their property, business rights, and interests, and in favour of the insertion therein of other clauses and provisions for their protection; or that such other Order may be made and relief given to your Petitioners in the premises as to your Honourable House shall seem meet.

And your Petitioners will ever pray, &c.

NAME.	ADDRESS.
Morrison, Dillon, & Co.	104, Fore-street.
Travers & Sons - -	19, Swithin's-lane.
I. & R. Morley - -	18, Wood-street.
Ward, Sturt, & Sharp -	89, Wood-street.
Sturt & Sharp - -	91, Wood-street.
Bradbury, Greatorex, & Co.	5, 6, and 7 Aldermanbury.
Pickford & Co. - -	Gresham-street.
George Brettle & Co. -	119, Wood-street.
Leaf, Sons, & Co. - -	Old Change.
Copestake, Moore, Crampton & Co.	5, Bow Churchyard.
Caldecott, Sons, & Willcocks.	19 to 25, Cheapside
R. W. Kennard & Co., per Charles Herbert.	67, Upper Thames-street.
Miles, Gold, & Co. -	29, Upper Thames-street.
Richard Hooper & Sons -	20, Queenhithe.
Peek, Brothers, & Co. -	20, Eastcheap, E.C.
H. H. & S. Budget & Co.	5, Monument-yard.
S. Gibbons & Co. - -	St. Andrew's Hill.
Chaplin & Horne - -	Thames-street.
Morewood & Co. - -	Dowgate Dock, Upper Thames-street.
W. E. Eddison -	2, Walbrook.
David Evans & Co. -	1, Wood-street.
John Cooper - -	Dowgate Hill.
Bevington & Sons - -	2, Cannon-street, West.
Saunders, Dyet, & Saunders.	4 & 5, Cole-street, West.
Warren S. Hale & Sons	71, Queen-street.
J. F. Good - - -	78, Queen-street.
White, Son, & Co. -	78, Watling-street.
Young, Shiels, & Co. -	17, Watling-street.
J. & A. Crocker - -	Friday-street.
J. & C. Boyd - -	7, Friday-street.
C. Candy & Co. - -	Watling-street.
F. Goodyear & Co. -	St. Paul's Churchyard.
I. F. Pawson & Co. -	St. Paul's Churchyard.
Ellis, Howell, & Co. -	St. Paul's Churchyard.
Cook, Son, & Co. - -	St. Paul's Churchyard.
Daniel Walters & Sons -	Newgate-street.
Robert & Christopher Milburn.	Newgate-street.
Burgess & Key - -	Newgate-street.
Faudel, Phillips, & Sons	Newgate-street.
William & Robert Morley	31, Gutter-lane.
Munt, Brown, & Co.	85, Wood-street.
Dent, Alcroft, Lycett & Co.	97, Wood-street.
Foster, Porter, & Co. -	47, Wood street.
Thomas Wisdom - -	4, Wood-street.
George Harker & Co. -	101, 102, 103, Upper Thames-street
J. & J. Colman - -	26, Cannon-street.
Gooch & Cousens - -	London Wall.

1116. What was the title of the Bill of 1863?

The London (City) Traffic Regulation Bill. That Bill was withdrawn upon this Petition. I wish to point out that in the present Bill there is no appeal whatever from the decision of the Court of Mayor and Aldermen, with the approval of the Secretary of State. In the former Bill, provision was made for an appeal on behalf of the merchants.

1117. Earl *De Grey.*] To which clause do you allude?

I allude to clause 13 of the present Bill.

1118. Earl *Stanhope.*] What form of appeal was provided in the Bill of 1863?

In the Bill of 1863 there was an appeal provided for, and the merchants had notice.

1119. To whom was that appeal?

I have not the original Bill before me.

1120. Surely, you would not recommend an appeal without having considered the point to whom that appeal should be made?

The merchants had notice given to them of the intention to carry out certain regulations, and there the merchants had power of appeal; I think that it was to the Secretary of State.

1121. *Chairman.*] There was an Act passed in 1863 (*handing the same to the Witness*). Is that the Bill to which you have alluded?

I believe that it is; I had not the Bill before me, but my impression was that notice must be put up at the Royal Exchange one month before any regulation could by law be enforced, and that the merchant thereby had information which enabled him to appeal to the Secretary of State against any regulations prejudicial to his interests.

1122. Earl *De Grey.*] Then, you rather mean an appeal to the Secretary of State than an appeal from the Secretary of State?

Yes, that is what I mean. In the present Bill there appears to be no such provision.

1123. That is to say, there is no provision for notice by which merchants and others would be aware of what was in contemplation?

Exactly so. I would observe that our customers, who reside in the suburbs round London, are in the habit of closing their receiving houses at seven o'clock in the evening, until nine o'clock the next morning, consequently carts have to be dispatched at all hours from our wholesale warehouse. It appears to me that such a trade as ours could not be carried on unless we had the freest opportunities of carrying it on in the daytime, at midday, and at all hours. One reason for that is that the restriction would seriously affect the cost of porters and carriers' labour. The men who carry on this business reside at distances from London; they have so few opportunities of residing near the heart of London, that they could not really come to carry on their business at such early hours and so late at night.

1124. *Chairman.*] To which clause are you now particularly alluding?

I am alluding to the 13th clause of the present Bill, giving power to the Mayor and Aldermen and the Secretary of State "to prohibit any cart, carriage, or other vehicle from coming into any street, or part of a street, for the purpose only of passing to its destination in some other street, or part of a street."

1125. You are aware that that clause does not fix any hours, but leaves it to the Secretary of State to fix the hours?

Yes, without any appeal from the merchant. We receive a great many orders by telegram all day long, and the deliveries of the post are so frequent that there is a perpetual arrival of orders from the country, and the goods are required to be forwarded by passenger trains, especially for funerals; and unless we had the freest access to the railways, and were allowed to dispatch our carts at midday, our trade would be most seriously injured, and not only our trade, but the trade of those who are in the same business as ourselves, the wholesale trade of London generally. It is within my own experience that the immense increase of traffic has destroyed, or almost destroyed, I would rather say seriously damaged, the retail trade of Ludgate-hill, for instance: the trade has gone. My partner had premises there which were unoccupied, although he wished to let them, because

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no persons would take them, and we have taken them ourselves in the wholesale business; therefore, we are most anxious to preserve the wholesale trade, the retail trade of the City being so seriously injured by the enormous amount of traffic which takes place. I would illustrate the advantage of giving considerable power to the police in this matter by stating that formerly on Lord Mayor's day, the 9th of November, barriers used to be placed across certain streets, and vehicles arriving after 11 o'clock were kept until the procession passed at four, stopping the traffic. No barriers are now used. Vehicles arriving at any side streets are allowed to cross the line of procession, and are thereby got rid of, and much less confusion than formerly is the consequence; the discretion is very properly vested in the policemen.

1126. Is that the rule in the City now?
That is the practice in the City now on the 9th of November. The streets are so narrow that you cannot turn the carts round. If a vehicle comes up there it must remain at the barriers, and they accumulate and block up the streets. It appears to me that the requirements day by day, as they occur, must be attended to on their own special merits and necessities. The superintendent of the police is the best party to whom to give authority.

1127. Then, in fact, you would prefer that the superintendent of police should make regulations, rather than that a higher authority should do so?
I do not think that the regulations are very desirable in themselves. My idea is that you should leave a great deal to the discretion of the policemen. Regulations may be very necessary to be applied to timber and heavy trucks with iron, and vehicles containing very heavy goods; but they ought not to be applied to the general trade of the country.

1128. Earl *De Grey.*] What I suppose you mean is, that you would prefer that the police should exercise a considerable supervision over the traffic while it is going on, so as to get carts and conveyances forward, and to pass them across the streets, rather than that the whole of the traffic should be stopped in any particular streets?
Yes, rather than under any positive legislative regulation.

1129. *Chairman.*] Have the police any legal power to enforce the regulations which that authority now make?
I believe that they have. Referring to the second portion of the 13th clause, without great care any restriction on this point would sadly interfere with the commerce of the City; that is, "with respect to the times during which carts, carriages, or other vehicles may be allowed to come into or remain in any street for the purpose of loading or unloading." I have little more to say on that subject than that a large trade is carried on in the City which is of the greatest importance to the merchants and to the City generally, and that unless it is allowed to have free circulation, it will be very seriously damaged indeed.

1130. Earl *Graham.*] What sort of carts are they which you employ?
They are rather light carts in our trade.

1131. Lord *Methuen.*] If the trade was placed under the supervision of the Commissioner of Police, surely he could give the necessary orders to enable the policemen on duty to allow carts of that kind to pass?
I think so.

1132. That would be in the hands of the Commissioner of Police?
London is so peculiarly constructed, and is so unfit for its work, that regulations which would be very proper in the very heart of the City, and where that trade is carried on, such as Wood-street, Aldermanbury, Friday-street, Creed-lane, and those very narrow streets, would be in my judgment most improper to be applied to the suburbs of London or other parts.

1133. *Chairman.*] You are aware that the special object of that clause is to meet the very case which you have suggested, namely, that certain very crowded streets should be put under certain regulations which were not to apply to the other streets?
Yes.

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st March 1867.

1134. Earl *Graham.*] Your objection is rather to these regulations having effect in the City, and not in the suburbs?

Yes, I understood that there was a radius of four miles.

1135. But the only objection which you have made is with regard to people in the City?

Yes.

1136. *Chairman.*] The general regulations as to the four miles are only to apply so far as regards the clauses in the Bill from 5 to 11, and clauses from 12 to 16 are intended for the following purpose: that the Secretary of State may make certain regulations with regard to certain crowded thoroughfares from time to time within that radius, but they are not intended to apply generally to the whole of that radius. The object is to give legal power to the Secretary of State to consent to certain regulations of the Commissioners of Police, which, in point of fact, it appears that the Commissioners of Police now make *ultra vires*, and which the policemen who carry them out, carry out acting under their instructions?

I suppose that the Secretary of State would arm himself upon these points, by consulting the Commissioners of Police. We have a very large French trade; the French goods arrive by the packets and by the South Eastern Railway, at 10 o'clock in the morning.

1137. Earl *Stanhope.*] What description of goods do you mean by "French goods?"

Silks, silk ribbons, and laces, and goods of foreign textile manufacture. Those goods arrive and are often wanted for immediate dispatch; and if they could not be brought up from the Custom House to our several warehouses and were to be retained, and only delivered late at night, it would seriously interfere with our business.

1138. Are they wanted in the manner which you describe for London delivery, or to be forwarded to the country?

They are wanted to be shown in the wholesale warehouse as soon as possible to be dispatched into the country. Business is now conducted with so much rapidity, that it is a necessity that it should be so. In my own business we receive and dispatch between 3,000 *l.* and 4,000 *l.* worth of goods every working day in the year.

The Witness is directed to Withdraw.

Ordered that the Committee be Adjourned to
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1. *Approval generally by Sir Richard Mayne of the proposed Restrictions as to the Delivery of Coals.*
2. *Detailed Objections to the proposed Restrictions.*
3. *Objections on the score of Price.*
4. *Objections with reference to the Supply of Manufactories.*
5. *Quantity of Coals now delivered in London, and Practice as to Delivery.*
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Large development of manufactures in the east-end of London, through the reduced price of coals, since the year 1838 down to a recent period, 1008——Supply of coal to the sugar refineries in Whitechapel and Mile End from the Great Western Railway, whence it is carted through the streets, 1009–1013——Supply of the Millwall Ironworks and the Thames Ironworks, chiefly from the Great Northern Railway, through the streets; question hereon, whether the coal is not now brought close to the former works by railway, 1009. 1014–1018.

Inevitable tendency of any material increase in the price of coal to drive from London the trade in iron shipbuilding and in sugar refining, 1018——Insufficiency at times of twelve hours a day for the delivery of the coal required for consumption in London, *ib.*——Effect of the proposed restrictions upon delivery after ten o'clock in the morning to lead to a very material increase in the price, *ib.*——Practice for many years past not to deliver in the leading thoroughfares after an early hour; approval of this practice being compulsory, if confined to the streets in question, 1019–1021.

Smith, William. (Analysis of his Evidence.)—Is bill inspector of the Royal Italian Opera, and represents the great hardship that would be inflicted under the Bill by the prohibition upon the employment of boardmen, or "sandwich men," bill distributors, &c., 1081–1097.

Snow, Removal of. Insufficiency of the present regulations as regards the removal of snow from footways, *Sir R. Mayne* 228——Great difficulty of the question of the removal of snow, *Colonel Fraser* 360.

Alterations suggested in Clause 18, with reference to the removal of snow, and the infliction of penalties for neglect in the matter, *Hon. A. Ponsonby* 771–774——Advantage if the parish authorities had power to use steam rollers for the removal of snow, &c., *ib.* 770. 774.

Exception taken to the enormous penalties which might be inflicted, as in the Westminster district, under Clause 18, relative to the removal of snow; suggested alteration also in the procedure as to fines, as well as in the amount, *Arntz* 781. 787–795——Proposed power in the local authorities to get rid of the snow by piling it up in the middle of the road, by casting it into the Thames, or by depositing it the parks or other open spaces, *ib.* 782–786. 796.

Snow, Removal of—continued.

Decided objections to the provisions and penalties under Clause 18, relative to the removal of snow from the City streets; complaint more especially as to the Commissioners being liable, at the instance of any inhabitant, to be summoned before a magistrate, and fined, *De Jersey* 949–976——Entire impracticability of the contractor removing in one day all the snowfall in the storm of January last, *ib.* 949——Removal of much of this snow into the river; doubt as to the contractors having any right thus to dispose of it, *ib.* 950–954. 977.

Special Limits (*Hours of Delivery*). Less difficulty to be experienced if the more crowded thoroughfares only were included in the proposed restrictions as to the hours of delivery of beer, &c., *Hanbury* 413. 439, 440——Great difficulty involved in any material enlargement of the area, beyond that of the City, within which the restrictions are to apply, *ib.* 414, 415. 438——Decided objection to absolute prohibition upon delivery of beer during certain hours in any radius or area, *Coxon* 454. 458, 459. 464. 469.

Importance of its being clearly laid down what streets are to be comprised in the special limits regulations; these streets might be published in the "Gazette," by the authority of the Commissioner of Police and of the Secretary of State, *Hanbury* 442–447——Approval of restrictions as to the hours of delivery if limited to the leading thoroughfares, *Coxon* 455–460. 469——Expediency of the streets being specified, in which the delivery of beer should be restricted, it being a question whether such streets should be named in the Act, or by the Commissioner of Police, with the sanction of the Secretary of State, *ib.* 461–465. 469–482——The streets to be closed should be the exception, not the rule, *ib.* 469.

Approval of certain specified thoroughfares being placed under restrictions as to delivery instead of the streets which are to be opened being the exception to the rule, *A. Fraser* 494–502.

Proposed limit, in the case of coals, of the number of excepted streets to thirty, it being important to have as few restrictions as possible, and to have the names of the streets clearly set forth, *Locket* 560–569.

Street Music. Suggested extension to the City of an Act passed in 1864 for regulating street music in the Metropolitan Police District, *Colonel Fraser* 381, 382.

T.

Through Traffic. Great inconvenience caused by the passage through crowded thoroughfares, of coals, &c. intended for delivery at points beyond, *Sir R. Mayne* 59. 68–70——Slight impediment caused by coal waggons in transit, the obstruction chiefly arising from the delivery, *Colonel Fraser* 284, 285.

Grounds for objecting to the carmen of coal waggons being required to avoid the leading thoroughfares in returning from delivery, *Locket* 576–584——Power of sending the waggons through the crowded thoroughfares of the City and west end for delivery elsewhere, *Locket and Davey* 592, 593.

Approval of certain routes being prescribed for traffic passing through the streets after a certain hour, so as to avoid the more crowded thoroughfares, *Clarke* 1028. 1032–1042. 1049–1051. 1069–1071.

Timber. Approval of clause 9, providing that between the hours of nine in the morning and six in the evening, no carts or waggons shall be driven laden with scaffolding, timber, &c., more than eight and a half feet in breadth, or twenty-five feet in length; any special grievance under this restriction might be met by a special licence, *Sir R. Mayne* 121–129——Beneficial operation in the City of the regulation as to vehicles containing timber, &c. exceeding in length twenty-five feet, or in breadth eight feet six inches, not passing through the streets within certain hours, *Colonel Fraser* 298, 299——Exception taken to the paragraph in clause 9, prohibiting projections more than three feet in front or behind any cart, *ib.* 299, 300.

Statement showing the magnitude of the timber trade of the Surrey Docks Company, *Griffin* 608–610——Immense interference with this trade by the restrictions under clause 9 of the Bill, providing that between ten in the morning and seven in the evening no cart conveying more than twenty-five feet in length or eight and a half feet in breadth, &c., shall pass through the streets, *ib.* 611 *et seq.*——Necessity of daylight in the selection and loading of timber in the docks, *ib.* 614, 615. 642, 643——Limited inconvenience experienced under the City bye-laws, as to the restrictions upon the delivery of timber, *ib.* 616–623.

Complaint especially as to the proposed restriction that the timber must not protrude more than three feet behind or in front of the vehicles, or more than one foot from the sides; an extension from three to eight feet would remove much of the difficulty, *Griffin* 617, *Timber*—continued.

617, 618. 624. 657. 685——Necessity of the timber passing along or crossing the leading thoroughfares in the way to its destination, *Griffin* 632–637. 684——Impracticability of carrying out the loading of the timber in the docks, if the carts had all to be loaded in a very short time; there would not, in fact, be room for all the carts at once, *ib.* 638–676——Obstacle to carrying out the loading in a short space of time by employing an increased number of labourers, *ib.* 663–672. 679, 680——Increasing deliveries of timber throughout the metropolis, so that an extension of restrictions from the City to the four-mile radius would be extremely inconvenient, *ib.* 678–683.

The 9th clause of the Bill before the Committee, would practically put an end to witness's timber trade, *Norton* 689——Sundry details in order to show the immense interference with the delivery of timber in the metropolis, by the restrictions as to the length and breadth of the timber sent through the streets between ten in the morning and seven in the evening, *ib.* 689 *et seq.*——Inconvenience already experienced under the City restrictions, these however being complied with as exceptional, and as applying only to a limited area, *ib.* 689, 690. 700–704. 744.

Witness submits that immense inconvenience would be caused to the timber trade in the metropolis by the restrictions in clause 9 of the Bill, *Bulmer* 747–763——The length of timber, as restricted for delivery during certain hours, should be not less than thirty-five feet instead of twenty-five, and a projection of more than eight feet in front of the cart should be allowed, *ib.* 751–760——The objections would be diminished if the restrictions applied only to some of the leading thoroughfares, *ib.* 758, 759.

See also *Hours of Delivery.* *Special Limits.*

W.

Warehousemen. Reference to warehousemen and traders in the City as having a strong case against the Bill, *Mason* 1080——Statement as to the immense inconvenience under the present Bill in supplying the retail traders from witness's warehouse and from the wholesale houses generally, any general restrictions as to the hour of delivery of goods being in fact very objectionable, *Howell* 1123–1138.

Wilful Disregard of Regulations. Explanation relative to the provision by clause 14, against "wilful" disregard of the regulations of the Bill, *Sir R. Mayne* 150–152.

Wine. Undue stringency of clause 6, as at present worded, in its application to the wine trade; suggestion that as regards the delivery of casks of wine the limitation should apply only to casks of a certain size, *Colonel Fraser* 267–278——Approval of less stringent regulations as to the delivery of wine than of beer, *ib.* 269. 278, 279.

Impossibility of the wine and spirit trade in the City being carried on if the restrictions in the 6th clause as to delivery are carried into effect, *Field* 979, 980. 984——Proposition that the restriction as to delivery should apply only to the Poultry, Cheapside, Ludgate-hill, Fleet-street, and Newgate-street, between the hours of ten and four, *ib.* 980–985——Practice at present not to deliver in the leading City thoroughfares between ten and four o'clock, *ib.* 983. 1090, 1091——Immense quantity of wines and spirits delivered daily within the four-mile radius dealt with by the Bill, *ib.* 936–989——Great inconvenience if the smaller casks were delivered separately from the butts and pipes, *ib.* 992, 993.

See also *Hours of Delivery.* *Special Limits.*